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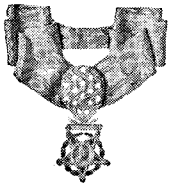
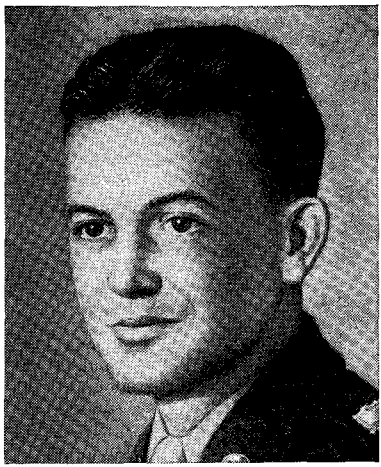
Medal of Honor





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SEPTEMBER, 1951 VOL. XLVIII, NO. 1

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NOTE FOR CHEMISTS

The American Chemical Society is holding its Seventy-fifth Anniversary Meeting in New York this September, beginning Labor Day. Those seventy-five years in review are more than mildly impressive; the 1876 model chemical science was basically something that Priestly and Lavoisier could have understood readily. But a modern technical session, with discussion of angstrom unit spacings between atoms, the molecular resonances, and the intricacies of enzyme and catalytic action would be a totally foreign language.

Foreign as the modern material would be to those old fathers of the science, the discussions planned on the impact of science—chemistry in particular—on civilization would be just as foreign to the chemists of seventy-five years ago.

In 1876, the primary effort of chemistry was to *extract from Nature the desired materials.* The background assumption of chemistry at that time—a basic philosophy so deeply assumed that it was not expressed, did not need to be stated—was the proposition that chemistry's business was to find in Nature, and extract in purified form, the materials needed, the ready-made molecules that industry required. Rubber from trees, metals from ores, drugs from plants.

The emphasis has changed vastly in that three-quarters of a century—less than one lifetime. The natural products, today, are extracted, and studied—usually, however, on a microchemical basis. A one-tenth milligram sample is adequate for many researches. Once the natural substance has been isolated and studied, the effort, instead of concentrating on improved methods of extraction, is directed toward synthesis, and towards synthesis of a

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more desirable similar material. Nature has a certain slight edge on chemical industry in producing useful materials—living things have had some 2,000,000,000 years to experiment. But it still seems highly improbable that the material 2,000,000,000 years of living-experimenting on the part of the havea tree and its ancestral forms developed for wound-healing is necessarily the best of all possible materials for automobile tires.

The sheep developed, through hundreds of millions of years, a fibrous material, wool, as an effective clothing material. But it seems somewhat improbable that it can be the best possible material for Man's needs. For one thing, the sheep has a perfect solution to the problem of wool shrinkage; just don't wash it, and keep it well oiled with lanolin to protect it against rain. That works just fine — and of course a sheep doesn't mind smelling like a wet sheep.

So much of modern chemistry's effort has been directed at taking *atoms* rather than *molecules* from natural sources, or taking molecular fragments from natural sources, and recombining them to totally new synthetics designed specifically for Man's uses. No animal or plant form ever attempted to handle the problem of containing one hundred per cent H_2SO_4; it is reasonable to suppose, therefore, that a synthetic, rather than a natural product would be needed for the job.

No living metabolism here on Earth is able to handle the exceedingly stable carbon-fluorine bond in any but the most tentative fashion; organic compounds containing fluorine are, as a consequence, practically unknown. But chemical industry, with the high-energy processes available to technical machinery, can handle even such powerful bonds — and produce materials like teflon which are totally immune to corrosion.

The past seventy-five years has been a period of change from the business of extraction-from-Nature to the business of synthesizing totally new chemical systems — compounds like polystyrene plastic do not exist in Nature, yet polystyrene has become one of the cheapest, most widely used, and most satisfactory product-materials. Everything from delicate electronic parts —polystyrene is one of the world's best insulating materials—to cookie jars—polystyrene is cheap, easily molded, attractive in appearance, relatively rugged, and easily cleaned —are being made from it.

But the next three-quarters of a century . . . ? What will be the direction of development?

My private guesstimate:

The beginnings of the new developments are, I think, now in sight. Polystyrene-like materials, required in ton-lots, basically simple, repetitive molecule structures, are ideal for machine production, for purely mechanical synthesis. But the swing away from Nature can go too far—

Continued on page 170

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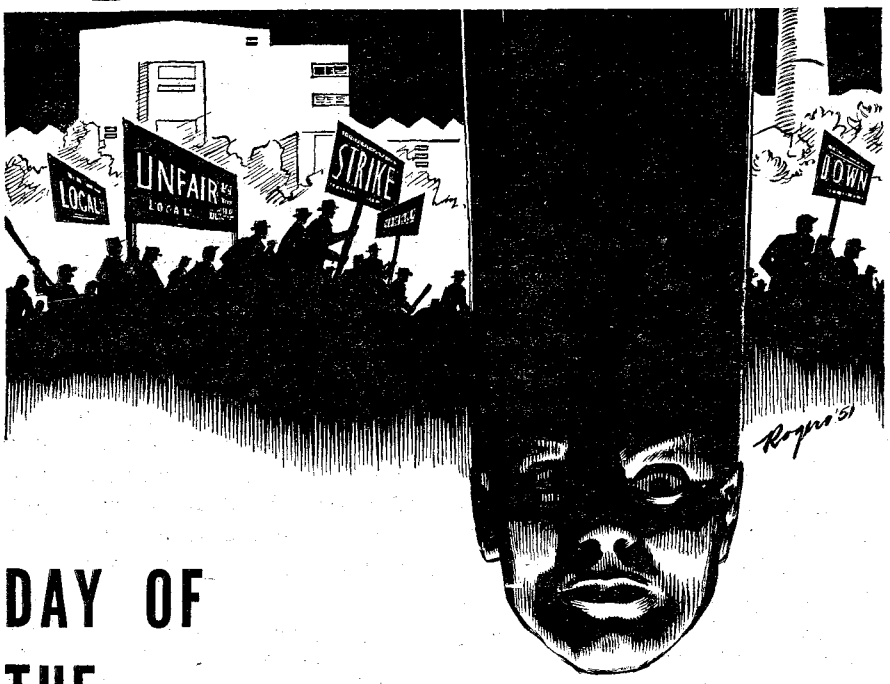

DAY OF THE MORON

BY H. BEAM PIPER

It's natural to trust the unproven word of the fellow who's "on my side" — but the emotional moron is on no one's side, not even his own. Once, such an emotional moron could, at worst, hurt a few. But with the mighty, leashed forces Man employs now. . . .

There were still, in 1968, a few people who were afraid of the nuclear power plant. Oldsters, in whom the term "atomic energy" produced semantic reactions associated with Hiroshima. Those who saw, in the towering steam-column above it, a tempting target for enemy—which still meant Soviet—bombers and guided missiles. Some of the Central Intelligence and F.B.I. people, who realized how futile even the most elaborate security measures were against a resource-

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ful and suicidally determined saboteur. And a minority of engineers and nuclear physicists who remained unpersuaded that accidental blowups at nuclear-reaction plants were impossible.

Scott Melroy was among these last. He knew, as a matter of fact, that there had been several nasty, meticulously unpublicized, near-catastrophes at the Long Island Nuclear Reaction Plant, all involving the new Doernberg-Giardano breeder-reactors, and that there had been considerable carefully-hushed top-level acrimony before the Melroy Engineering Corporation had been given the contract to install the fully cybernetic control system intended to prevent a recurrence of such incidents.

That had been three months ago. Melroy and his people had moved in, been assigned sections of a couple of machine shops, set up an assembly shop and a set of plyboard-partitioned offices in a vacant warehouse just outside the reactor area, and tried to start work, only to run into the almost interminable procedural disputes and jurisdictional wranglings of the sort which he privately labeled "bureau bunk". It was only now that he was ready to begin work on the reactors.

He sat at his desk, in the inner of three successively smaller offices on the second floor of the converted warehouse, checking over a symbolic-logic analysis of a relay system and, at the same time, sharpening a pencil, his knife paring off tiny feathery shavings of wood. He was a tall, sparely-built, man of indeterminate age, with thinning sandy hair, a long Gaelic upper lip, and a wide, half-humorous, half-weary mouth; he wore an open-necked shirt, and an old and shabby leather jacket, to the left shoulder of which a few clinging flecks of paint showed where some military emblem had been, long ago. While his fingers worked with the jackknife and his eyes traveled over the page of closely-written symbols, his mind was reviewing the eight different ways in which one of the efficient but treacherous Doernberg-Giardano reactors could be allowed to reach critical mass, and he was wondering if there might not be some unsuspected ninth way. That was a possibility which always lurked in the back of his mind, and lately it had been giving him surrealistic nightmares.

"Mr. Melroy!" the box on the desk in front of him said suddenly, in a feminine voice. "Mr. Melroy, Dr. Rives is here."

Melroy picked up the handphone, thumbing on the switch.

"Dr. Rives?" he repeated.

"The psychologist who's subbing for Dr. von Heydenreich," the box told him patiently.

"Oh, yes. Show him in," Melroy said.

"Right away, Mr. Melroy," the box replied.

Replacing the handphone, Melroy wondered, for a moment, why there

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had been a hint of suppressed amusement in his secretary's voice. Then the door opened and he stopped wondering. Dr. Rives wasn't a him; she was a her. Very attractive looking her, too—dark hair and eyes, rather long-oval features, clear, lightly tanned complexion, bright red lipstick put on with a micrometric exactitude that any engineer could appreciate. She was tall, within four inches of his own six-foot mark, and she wore a black tailored outfit, perfectly plain, which had probably cost around five hundred dollars and would have looked severe and mannish except that the figure under it curved and bulged in just the right places and to just the right degree.

Melroy rose, laying down knife and pencil and taking his pipe out of his mouth.

"Good afternoon," he greeted. "Dr. von Heydenreich gave me quite a favorable account of you—as far as it went. He might have included a few more data and made it more so . . . Won't you sit down?"

The woman laid her handbag on the desk and took the visitor's chair, impish mirth sparking in her eyes.

"He probably omitted mentioning that the D. is for Doris," she suggested. "Suppose I'd been an Englishman with a name like Evelyn or Vivian?"

Melroy tried to visualize her as a male Englishman named Vivian, gave up, and grinned at her.

"Let this be a lesson," he said. "Inferences are to be drawn from objects, or descriptions of objects; never from verbal labels. Do you initial your first name just to see how people react when they meet you?"

"Well, no, though that's an amusing and sometimes instructive by-product. It started when I began contributing to some of the professional journals. There's still a little of what used to be called male sex-chauvinism among my colleagues, and some who would be favorably impressed with an article signed D. Warren Rives might snort in contempt at the same article signed Doris Rives."

"Well, fortunately, Dr. von Heydenreich isn't one of those," Melroy said. "How is the Herr Doktor, by the way, and just what happened to him? Miss Kourtakides merely told me that he'd been injured and was in a hospital in Pittsburgh."

"The Herr Doktor got shot," Doris Rives informed him. "With a charge of BB's, in a most indelicate portion of his anatomy. He was out hunting, the last day of small-game season, and somebody mistook him for a turkey. Nothing really serious, but he's face down in bed, cursing hideously in German, English, Russian, Italian and French, mainly because he's missing deer hunting."

"I might have known it," Melroy said in disgust. "The ubiquitous lame-brain with a dangerous mechanism. . . . I suppose he briefed you on what I want done, here?"

"Well, not too completely. I gathered that you want me to give intel-

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ligence tests, or aptitude tests, or something of the sort, to some of your employees. I'm not really one of these so-called industrial anthropologists," she explained. "Most of my work, for the past few years, has been for public-welfare organizations, with subnormal persons. I told him that, and he said that was why he selected me. He said one other thing. He said, 'I used to think Melroy had an obsession about fools; well, after stopping this load of shot, I'm beginning to think it's a good subject to be obsessed about.' "

Melroy nodded. " 'Obsession' will probably do. 'Phobia' would be more exact. I'm afraid of fools, and the chance that I have one working for me, here, affects me like having a cobra crawling around my bedroom in the dark. I want you to locate any who might be in a gang of new men I've had to hire, so that I can get rid of them."

"And just how do you define the term 'fool', Mr. Melroy?" she asked. "Remember, it has no standard meaning. Republicans apply it to Democrats, and vice versa."

"Well, I apply it to people who do things without considering possible consequences. People who pepper distinguished Austrian psychologists in the pants-seat with turkey-shot, for a starter. Or people who push buttons to see what'll happen, or turn valves and twiddle with dial-knobs because they have nothing else to do with their hands. Or shoot insulators off power lines to see if they can hit them. People who don't know it's loaded. People who think warning signs are purely ornamental. People who play practical jokes. People who—"

"I know what you mean. Just day - before - yesterday, I saw a woman toss a cocktail into an electric heater. She didn't want to drink it, and she thought it would just go up in steam. The result was slightly spectacular."

"Next time, she won't do that. She'll probably throw her drink into a lead-ladle, if there's one around. Well, on a statistical basis, I'd judge that I have three or four such dud rounds among this new gang I've hired. I want you to put the finger on them, so I can bounce them before they blow the whole plant up, which could happen quite easily."

"That," Doris Rives said, "is not going to be as easy as it sounds. Ordinary intelligence-testing won't be enough. The woman I was speaking of has an I.Q. well inside the meaning of normal intelligence. She just doesn't use it."

"Sure." Melroy got a thick folder out of his desk and handed it across. "Heydenreich thought of that, too. He got this up for me, about five years ago. The intelligence test is based on the new French Sûreté test for mentally deficient criminals. Then there's a memory test, and tests for judgment and discrimination, semantic reactions, temperamental and emotional makeup, and general mental attitude."

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She took the folder and leafed through it. "Yes, I see. I always liked this Sûreté test. And this memory test is a honey— 'One hen, two ducks, three squawking geese, four corpulent porpoises, five Limerick oysters, six pairs of Don Alfonso tweezers . . .' I'd like to see some of these memory-course boys trying to make visual images of six pairs of Don Alfonso tweezers. And I'm going to make a copy of this word-association list. It's really a semantic reaction test; Korzybski would have loved it. And, of course, our old friend, the Rorschach Ink-Blots. I've always harbored the impious suspicion that you can prove almost anything you want to with that. But these question-suggestions for personal interview are really crafty. Did Heydenreich get them up himself?"

"Yes. And we have stacks and stacks of printed forms for the written portion of the test, and big cards to summarize each subject on. And we have a disk-recorder to use in the oral tests. There'll have to be a pretty complete record of each test, in case—"

The office door opened and a bulky man with a black mustache entered, beating the snow from his overcoat with a battered porkpie hat and commenting blasphemously on the weather. He advanced into the room until he saw the woman in the chair beside the desk, and then started to back out.

"Come on in, Sid," Melroy told him. "Dr. Rives, this is our general foreman, Sid Keating. Sid, Dr. Rives, the new dimwit detector. Sid's in direct charge of personnel," he continued, "so you two'll be working together quite a bit."

"Glad to know you, doctor," Keating said. Then he turned to Melroy. "Scott, you're really going through with this, then?" he asked. "I'm afraid we'll have trouble, then."

"Look, Sid," Melroy said. "We've been all over that. Once we start work on the reactors, you and Ned Puryear and Joe Ricci and Steve Chalmers can't be everywhere at once. A cybernetic system will only do what it's been assembled to do, and if some quarter-wit assembles one of these things wrong—" He left the sentence dangling; both men knew what he meant.

Keating shook his head. "This union's going to bawl like a branded calf about it," he predicted. "And if any of the dear sirs and brothers get washed out—" That sentence didn't need to be completed, either.

"We have a right," Melroy said, "to discharge any worker who is, quote, of unsound mind, deficient mentality or emotional instability, unquote. It says so right in our union contract, in nice big print."

"Then they'll claim the tests are wrong."

"I can't see how they can do that," Doris Rives put in, faintly scandalized.

"Neither can I, and they probably won't either," Keating told her.

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"But they'll go ahead and do it. Why, Scott, they're pulling the Number One Doernberg-Giardano, tonight. By oh-eight-hundred, it ought to be cool enough to work on. Where will we hold the tests? Here?"

"We'll have to, unless we can get Dr. Rives security-cleared." Melroy turned to her. "Were you ever security-cleared by any Government agency?"

"Oh, yes. I was with Armed Forces Medical, Psychiatric Division, in Indonesia in '62 and '63, and I did some work with mental fatigue cases at Tonto Basin Research Establishment in '64."

Melroy looked at her sharply. Keating whistled.

"If she could get into Tonto Basin, she can get in here," he declared.

"I should think so. I'll call Colonel Bradshaw, the security officer."

"That way, we can test them right on the job," Keating was saying. "Take them in relays. I'll talk to Ben about it, and we'll work up some kind of a schedule." He turned to Doris Rives. "You'll need a wrist-Geiger, and a dosimeter. We'll furnish them," he told her. "I hope they don't try to make you carry a pistol, too."

"A pistol?" For a moment, she must have thought he was using some technical-jargon term, and then it dawned on her that he wasn't. "You mean—?" She cocked her thumb and crooked her index finger.

"Yeah. A rod. Roscoe. The Equalizer. We all have to." He half-lifted one out of his side pocket. "We're all United States deputy marshals. They don't bother much with counterespionage, here, but they don't fool when it comes to countersabotage. Well, I'll get an order cut and posted. Be seeing you, doctor."

"You think the union will make trouble about these tests?" she asked, after the general foreman had gone out.

"They're sure to," Melroy replied. "Here's the situation. I have about fifty of my own men, from Pittsburgh, here, but they can't work on the reactors because they don't belong to the Industrial Federation of Atomic Workers, and I can't just pay their initiation fees and union dues and get union cards for them, because admission to this union is on an annual quota basis, and this is December, and the quota's full. So I have to use them outside the reactor area, on fabrication and assembly work. And I have to hire through the union, and that's handled on a membership seniority basis, so I have to take what's thrown at me. That's why I was careful to get that clause I was quoting to Sid written into my contract.

"Now, here's what's going to happen. Most of the men'll take the test without protest, but a few of them'll raise the roof about it. Nothing burns a moron worse than to

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have somebody question his fractional intelligence. The odds are that the ones that yell the loudest about taking the test will be the ones who get scrubbed out, and when the test shows that they're deficient, they won't believe it. A moron simply cannot conceive of his being anything less than perfectly intelligent, any more than a lunatic can conceive of his being less than perfectly sane. So they'll claim we're framing them, for an excuse to fire them. And the union will have to back them up, right or wrong, at least on the local level. That goes without saying. In any dispute, the employer is always wrong and the worker is always right, until proven otherwise. And that takes a lot of doing, believe me!"

"Well, if they're hired through the union, on a seniority basis, wouldn't they be likely to be experienced and competent workers?" she asked.

"Experienced, yes. That is, none of them has ever been caught doing anything downright calamitous . . . yet," Melroy replied. "The moron I'm afraid of can go on for years, doing routine work under supervision, and nothing'll happen. Then, some day, he does something on his own lame-brained initiative, and when he does, it's only at the whim of whatever gods there be that the result isn't a wholesale catastrophe. And people like that are the most serious threat facing our civilization today, atomic war not excepted."

Dr. Doris Rives lifted a delicately penciled eyebrow over that. Melroy, pausing to relight his pipe, grinned at her.

"You think that's the old obsession talking?" he asked. "Could be. But look at this plant, here. It generates every kilowatt of current used between Trenton and Albany, the New York metropolitan area included. Except for a few little storage-battery or Diesel generator systems, that couldn't handle one tenth of one per cent of the barest minimum load, it's been the only source of electric current here since 1962, when the last coal-burning power plant was dismantled. Knock this plant out and you darken every house and office and factory and street in the area. You immobilize the elevators—think what that would mean in lower and midtown Manhattan alone. And the subways. And the new endless-belt conveyors that handle eighty per cent of the city's freight traffic. And the railroads—there aren't a dozen steam or Diesel locomotives left in the whole area. And the pump stations for water and gas and fuel oil. And seventy per cent of the space-heating is electric, now. Why, you can't imagine what it'd be like. It's too gigantic. But what you can imagine would be a nightmare.

"You know, it wasn't so long ago, when every home lighted and heated itself, and every little industry was a self-contained unit, that a fool couldn't do great damage unless he inherited a throne or was placed in command of an army, and that

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didn't happen nearly as often as our leftist social historians would like us to think. But today, everything we depend upon is centralized, and vulnerable to blunder-damage. Even our food—remember that poisoned soft-drink horror in Chicago, in 1963; three thousand hospitalized and six hundred dead because of one man's stupid mistake at a bottling plant." He shook himself slightly, as though to throw off some shadow that had fallen over him, and looked at his watch. "Sixteen hundred. How did you get here? Fly your own plane?"

"No; I came by T.W.A. from Pittsburgh. I have a room at the new Midtown City hotel, on Forty-seventh Street; I had my luggage sent on there from the airport and came out on the Long Island subway."

"Fine. I have a room at Midtown City, myself, though I sleep here about half the time." He nodded toward a door on the left. "Suppose we go in and have dinner together. This cafeteria, here, is a horrible place. It's run by a dietitian instead of a chef, and everything's so white-enamel antiseptic that I swear I smell belladonna-icthyol ointment every time I go in the place. Wait here till I change clothes."

At the Long Island plant, no one was concerned about espionage—neither the processes nor the equipment used there were secret—but the countersabotage security was fantastically thorough. Every person or

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scrap of material entering the reactor area was searched; the life-history of every man and woman employed there was known back to the cradle. A broad highway encircled it outside the fence, patrolled night and day by twenty General Stuart cavalry-tanks. There were a thousand soldiers, and three hundred Atomic Power Authority police, and only God knew how many F.B.I. and Central Intelligence undercover agents. Every supervisor and inspector and salaried technician was an armed United States deputy marshal. And nobody, outside the Department of Defense, knew how much radar and counter-rocket and fighter protection the place had, but the air-defense zone extended from Boston to Philadelphia and as far inland as Wilkes-Barre, Pennsylvania.

The Long Island Nuclear Power Plant, Melroy thought, had all the invulnerability of Achilles—and no more.

The six new Doernberg-Giardano breeder-reactors clustered in a circle inside a windowless concrete building at the center of the plant. Beside their primary purpose of plutonium production, they furnished heat for the sea-water distillation and chemical extraction system, processing the water that was run through the steam boilers at the main power reactors, condensed, redistilled, and finally pumped, pure, into the water mains of New York. Safe outside the shielding, in a corner of a high-ceilinged room, was the plyboard-screened on-the-job office of the Melroy Engineering Corporation's timekeepers and foremen. Beyond, along the far wall, were the washroom and locker room and lunch room of the workmen.

Sixty or seventy men, mostly in white coveralls and all wearing identification badges and carrying dosimeters in their breast pockets and midget Geigers strapped to their wrists, were crowded about the bulletin-board in front of the makeshift office. There was a hum of voices—some perplexed or angry, but mostly good-humored and bantering. As Melroy and Doris Rives approached, the talking died out and the men turned. In the sudden silence, one voice, harshly strident, continued:

". . . do they think this is, anyhow? We don't hafta take none of that."

Somebody must have nudged the speaker, trying without success to hush him. The bellicose voice continued, and Melroy spotted the speaker—short, thick-set, his arms jutting out at an angle from his body, his heavy features soured with anger.

"Like we was a lotta halfwits, 'r nuts, 'r some'n! Well, we don't hafta stand for this. They ain't got no right—"

Doris Rives clung tighter to Melroy's arm as he pushed a way for himself and her through the crowd and into the temporary office. Inside, they were met by a young man with a deputy marshal's badge on

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his flannel shirt and a .38 revolver on his hip.

"Ben Puryear; Dr. Rives," Melroy introduced. "Who's the mouthy character outside?"

"One of the roustabouts; name's Burris," Puryear replied. "Washroom lawyer."

Melroy nodded. "You always get one or two like that. How're the rest taking it?"

Puryear shrugged. "About how you'd expect. A lot of kidding about who's got any intelligence to test. Burris seems to be the only one who's trying to make an issue out of it."

"Well, what are they doing ganged up here?" Melroy wanted to know. "It's past oh-eight-hundred; why aren't they at work?"

"Reactor's still too hot. Temperature and radioactivity both too high; radioactivity's still up around eight hundred REM's."

"Well, then, we'll give them all the written portion of the test together, and start the personal interviews and oral tests as soon as they're through." He turned to Doris Rives. "Can you give all of them the written test together?" he asked. "And can Ben help you—distributing forms, timing the test, seeing that there's no fudging, and collecting the forms when they're done?"

"Oh, yes; all they'll have to do is follow the printed instructions." She looked around. "I'll need a desk, and an extra chair for the interview subject."

"Right over here, doctor," Puryear said. "And here are the forms and cards, and the sound-recorder, and blank sound disks."

"Yes," Melroy added. "Be sure you get a recording of every interview and oral test; we may need them for evidence."

He broke off as a man in white coveralls came pushing into the office. He was a scrawny little fellow with a wide, loose-lipped mouth and a protuberant Adam's apple; beside his identity badge, he wore a two-inch celluloid button lettered: I.F.A.W. STEWARD.

"Wanta use the phone," he said. "Union business."

Melroy gestured toward a telephone on the desk beside him. The newcomer shook his head, twisting his mouth into a smirk.

"Not that one; the one with the whisper mouthpiece," he said. "This is private union business."

Melroy shrugged and indicated another phone. The man with the union steward's badge picked it up, dialed, and held a lengthy conversation into it, turning his head away in case Melroy might happen to be a lip reader. Finally he turned.

"Mr. Crandall wants to talk to you," he said, grinning triumphantly, the phone extended to Melroy.

The engineer picked up another phone, snapping a button on the base of it.

"Melroy here," he said.

Something on the line started going *bee-beep-beep* softly.

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"Crandall, executive secretary, I.F.A.W.," the man on the other end of the line identified himself. "Is there a recorder going on this line?"

"Naturally," Melroy replied. "I record all business conversations; office routine."

"Mr. Melroy, I've been informed that you propose forcing our members in your employ to submit to some kind of a mental test. Is that correct?"

"Not exactly. I'm not able to force anybody to submit to anything against his will. If anybody objects to taking these tests, he can say so, and I'll have his time made out and pay him off."

"That's the same thing. A threat of dismissal is coercion, and if these men want to keep their jobs they'll have to take this test."

"Well, that's stated more or less correctly," Melroy conceded. "Let's just put it that taking—and passing—this test is a condition of employment. My contract with your union recognizes my right to establish standards of intelligence; that's implied by my recognized right to dismiss any person of 'unsound mind, deficient mentality or emotional instability.' Psychological testing is the only means of determining whether or not a person is classifiable in those terms."

"Then, in case the test purports to show that one of these men is, let's say, mentally deficient, you intend dismissing him?"

"With the customary two weeks' severance-pay, yes."

"Well, if you do dismiss anybody on those grounds, the union will have to insist on reviewing the grounds for dismissal."

"My contract with your union says nothing whatever about any right of review being reserved by the union in such cases. Only in cases of disciplinary dismissal, which this is not. I take the position that certain minimum standards of intelligence and mental stability are essentials in this sort of work, just as, say, certain minimum standards of literacy are essential in clerical work."

"Then you're going to make these men take these tests, whatever they are?"

"If they want to work for me, yes. And anybody who fails to pass them will be dropped from my payroll."

"And who's going to decide whether or not these men have successfully passed these tests?" Crandall asked. "You?"

"Good Lord, no! I'm an electronics engineer, not a psychologist. The tests are being given, and will be evaluated, by a graduate psychologist, Dr. D. Warren Rives, who has a diploma from the American Board of Psychiatry and Neurology and is a member of the American Psychological Association. Dr. Rives will be the final arbiter on who is or is not disqualified by these tests."

"Well, our man Koffler says you have some girl there to give the tests," Crandall accused.

"I suppose he means Dr. Rives,"

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Melroy replied. "I can assure you, she is an extremely competent psychologist, however. She came to me most highly recommended by Dr. Karl von Heydenreich, who is not inclined to be careless with his recommendations."

"Well, Mr. Melroy, we don't want any more trouble with you than we have to have," Crandall told him, "but we will insist on reviewing any dismissals which occur as a result of these tests."

"You can do that. I'd advise, first, that you read over the contract you signed with me. Get a qualified lawyer to tell you what we've agreed to and what we haven't. Was there anything else you wanted to talk about? . . . No? . . . Then good morning, Mr. Crandall."

He hung up. "All right; let's get on with it," he said. "Ben, you get them into the lunch room; there are enough tables and benches in there for everybody to take the written test in two relays."

"The union's gotta be represented while these tests is going on," the union steward announced. "Mr. Crandall says I'm to stay here an' watch what you do to these guys."

"This man working for us?" Melroy asked Puryear.

"Yes. Koffler, Julius. Electrical fitter; Joe Ricci's gang."

"All right. See to it that he gets placed in the first relay for the written test, and gets first turn for the orals. That way he can spend the rest of his time on duty here for the union, and will know in advance what the test is like." He turned to Koffler. "But understand this. You keep your mouth out of it. If you see anything that looks objectionable, make a note of it, but don't try to interfere."

The written tests, done on printed forms, required about twenty minutes. Melroy watched the process of oral testing and personal interviewing for a while, then picked up a big flashlight and dropped it into his overcoat pocket, preparatory to going out to inspect some equipment that had been assembled outside the reactor area and brought in. As he went out, Koffler was straddling a chair, glowering at Doris Rives and making occasional ostentatious notes on a pad.

For about an hour, he poked around the newly assembled apparatus, checking the wiring, and peering into it. When he returned to the temporary office, the oral testing was still going on; Koffler was still on duty as watcher for the union, but the sport had evidently palled on him, for he was now studying a comic book.

Melroy left the reactor area and returned to the office in the converted area. During the midafternoon, somebody named Leighton called him from the Atomic Power Authority executive office, wanting to know what was the trouble between him and the I.F.A.W. and saying that a protest against his alleged high-handed and arbitrary

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conduct had been received from the union.

Melroy explained, at length. He finished: "You people have twenty Stuart tanks, and a couple of thousand soldiers and cops and undercover-men, here, guarding against sabotage. Don't you realize that a workman who makes stupid or careless or impulsive mistakes is just as dangerous to the plant as any saboteur? If somebody shoots you through the head, it doesn't matter whether he planned to murder you for a year or just didn't know the gun was loaded; you're as dead one way as the other. I should think you'd thank me for trying to eliminate a serious source of danger."

"Now, don't misunderstand my position, Mr. Melroy," the other man hastened to say. "I sympathize with your attitude, entirely. But these people are going to make trouble."

"If they do, it'll be my trouble. I'm under contract to install this cybernetic system for you; you aren't responsible for my labor policy," Melroy replied. "Oh, have you had much to do with this man Crandall, yourself?"

"Have I had—!" Leighton sputtered for a moment. "I'm in charge of personnel, here; that makes me his top-priority target, all the time."

"Well, what sort of a character is he, anyhow? When I contracted with the I.F.A.W., my lawyer and their lawyer handled everything; I never even met him."

"Well— He has his job to do, the same as I have," Leighton said. "He does it conscientiously. But it's like this—anything a workman tells him is the truth, and anything an employer tells him is a dirty lie. Until proven differently, of course, but that takes a lot of doing. And he goes off half-cocked a lot of times. He doesn't stop to analyze situations very closely."

"That's what I was afraid of. Well, you tell him you don't have any control over my labor relations. Tell him to bring his gripes to me."

At sixteen-thirty, Doris Rives came in, finding him still at his desk.

"I have the written tests all finished, and I have about twenty of the tests and interviews completed," she said. "I'll have to evaluate the results, though. I wonder if there's a vacant desk around here, anywhere, and a record player."

"Yes, sure. Ask Joan to fix you up; she'll find a place for you to work. And if you're going to be working late, I'll order some dinner for you from the cafeteria. I'm going to be here all evening, myself."

Sid Keating came in, a short while later, peeling out of his overcoat, jacket and shoulder holster.

"I don't think they got everything out of that reactor," he said. "Radioactivity's still almost active-normal—about eight hundred REM's—and the temperature's away up, too. That isn't lingering radiation; that's prompt radiation."

"Radioactivity hasn't dropped since morning; I'd think so, too,"

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Melroy said. "What are they getting on the breakdown counter?"

"Mostly neutrons and alpha-particles. I talked to Fred Hausinger, the maintenance boss; he doesn't like it, either."

"Well, I'm no nuclear physicist," Melroy disclaimed, "but all that alpha stuff looks like a big chunk of Pu-239 left inside. What's Fred doing about it?"

"Oh, poking around inside the reactor with telemetered scanners and remote-control equipment. When I left, he had a gang pulling out graphite blocks with RC-tongs. We probably won't get a chance to work on it much before thirteen-hundred tomorrow." He unzipped a bulky brief case he had brought in under his arm and dumped papers onto his desk. "I still have this stuff to get straightened out, too."

"Had anything to eat? Then call the cafeteria and have them send up three dinners. Dr. Rives is eating here, too. Find out what she wants; I want pork chops."

"Uh-huh; Li'l Abner Melroy; po'k chops unless otherwise specified." Keating got up and went out into the middle office. As he opened

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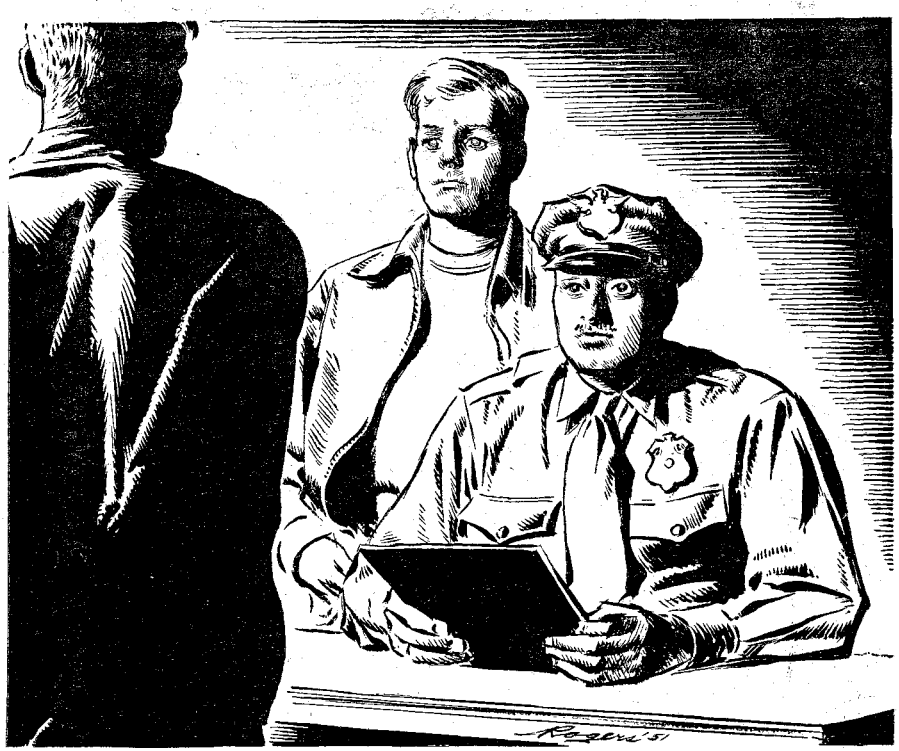

the door, Melroy could hear a recording of somebody being given a word-association test.

Half an hour later, when the food arrived, they spread their table on a relatively clear desk in the middle office. Doris Rives had finished evaluating the completed tests; after dinner, she intended going over the written portions of the uncompleted tests.

"How'd the finished tests come out?" Melroy asked her.

"Better than I'd expected. Only two washouts," she replied. "Harvey Burris and Julius Koffler."

"Oh, *no!*" Keating wailed. "The I.F.A.W. steward, and the loudest-mouthed I-know-my-rights boy on the job!"

"Well, wasn't that to be expected?" Melroy asked. "If you'd seen the act those two put on—"

"They're both inherently stupid, infantile, and deficient in reasoning ability and judgment," Doris said. "Koffler is a typical adolescent problem-child show-off type, and Burris is an almost perfect twelve-year-old schoolyard bully. They both have inferiority complexes long enough to step on. If the purpose of

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this test is what I'm led to believe it is, I can't, in professional good conscience, recommend anything but that you get rid of both of them."

"What Bob's getting at is that they're the very ones who can claim, with the best show of plausibility, that the test is just a pretext to fire them for union activities," Melroy explained. "And the worst of it is, they're the only ones."

"Maybe we can scrub out a couple more on the written tests alone. Then they'll have company," Keating suggested.

"No, I can't do that." Doris was firm on the point. "The written part of the test was solely for ability to reason logically. Just among the three of us, I know some university professors who'd flunk on that. But if the rest of the tests show stability, sense of responsibility, good judgment, and a tendency to think before acting, the subject can be classified as a safe and reliable workman."

"Well, then, let's don't say anything till we have the tests all finished," Keating proposed.

"No!" Melroy cried. "Every minute those two are on the job, there's a chance they may do something disastrous. I'll fire them at oh-eight-hundred tomorrow."

"All right," Keating shook his head. "I only work here. But don't say I didn't warn you."

By 0930 the next morning, Keating's forebodings began to be realized. The first intimation came with a phone call to Melroy from Crandall, who accused him of having used the psychological tests as a fraudulent pretext for discharging Koffler and Burris for union activities. When Melroy rejected his demand that the two men be reinstated, Crandall demanded to see the records of the tests.

"They're here at my office," Melroy told him. "You're welcome to look at them, and hear recordings of the oral portions of the tests. But I'd advise you to bring a professional psychologist along, because unless you're a trained psychologist yourself, they're not likely to mean much to you."

"Oh, sure!" Crandall retorted. "They'd have to be unintelligible to ordinary people, or you couldn't get away with this frame-up! Well, don't worry, I'll be along to see them."

Within ten minutes, the phone rang again. This time it was Leighton, the Atomic Power Authority man.

"We're much disturbed about this dispute between your company and the I.F.A.W.," he began.

"Well, frankly, so am I," Melroy admitted. "I'm here to do a job, not play Hatfields and McCoys with this union. I've had union trouble before, and it isn't fun. You're the gentleman who called me last evening, aren't you? Then you understand my position in the matter."

"Certainly, Mr. Melroy. I was talking to Colonel Bradshaw, the security officer, last evening. He

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agrees that a stupid or careless workman is, under some circumstances, a more serious threat to security than any saboteur. And we realize fully how dangerous those Doernberg-Giardanos are, and how much more dangerous they'd be if these cybernetic controls were improperly assembled. But this man Crandall is talking about calling a strike."

"Well, let him. In the first place, it'd be against me, not against the Atomic Power Authority. And, in the second place, if he does and it goes to Federal mediation, his demand for the reinstatement of those men will be thrown out, and his own organization will have to disavow his action, because he'll be calling the strike against his own contract."

"Well, I hope so." Leighton's tone indicated that the hope was rather dim. "I wish you luck; you're going to need it."

Within the hour, Crandall arrived at Melroy's office. He was a young man; he gave Melroy the impression of having recently seen military service; probably in the Indonesian campaign of '62 and '63; he also seemed a little cocky and oversure of himself.

"Mr. Melroy, we're not going to stand for this," he began, as soon as he came into the room. "You're using these so-called tests as a pretext for getting rid of Mr. Koffler and Mr. Burris because of their legitimate union activities."

"Who gave you that idea?" Melroy wanted to know. "Koffler and Burris?"

"That's the complaint they made to me, and it's borne out by the facts," Crandall replied. "We have on record at least half a dozen complaints that Mr. Koffler has made to us about different unfair work-assignments, improper working conditions, inequities in alloting overtime work, and other infractions of union-shop conditions, on behalf of Mr. Burris. So you decided to get rid of both of them, and you think you can use this clause in our contract with your company about persons of deficient intelligence. The fact is, you're known to have threatened on several occasions to get rid of both of them."

"I am?" Melroy looked at Crandall curiously, wondering if the latter were serious, and deciding that he was. "You must believe *anything* those people tell you. Well, they lied to you if they told you that."

"Naturally that's what you'd say," Crandall replied. "But how do you account for the fact that those two men, and only those two men, were dismissed for alleged deficient intelligence?"

"The tests aren't all made," Melroy replied. "Until they are, you can't say that they are the only ones disqualified. And if you look over the records of the tests, you'll see where Koffler and Burris failed and the others passed. Here." He laid the pile of written-test forms and the summary and evaluation sheets on the desk. "Here's Koffler's, and

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here's Burris'; these are the ones of the men who passed the test. Look them over if you want to."

Crandall examined the forms and summaries for the two men who had been discharged, and compared them with several random samples from the satisfactory pile.

"Why, this stuff's a lot of gibberish!" he exclaimed indignantly. "This thing, here: '. . . five Limerick oysters, six pairs of Don Alfonso tweezers, seven hundred Macedonian warriors in full battle array, eight golden crowns from the ancient, secret crypts of Egypt, nine lymphatic, sympathetic, peripatetic old men on crutches, and ten revolving heliotropes from the Ipsy-Wipsy Institute!' Great Lord, do you actually mean that you're using this stuff as an excuse for depriving men of their jobs?"

"I warned you that you should have brought a professional psychologist along," Melroy reminded him. "And maybe you ought to get Koffler and Burris to repeat their complaints on a lie-detector, while you're at it. They took the same tests, in the same manner, as any of the others. They just didn't have the mental equipment to cope with them and the others did. And for that reason, I won't run the risk of having them working on this job."

"That's just your word against theirs," Crandall insisted obstinately. "Their complaint is that you framed this whole thing up to get rid of them."

"Why, I didn't even know who either of them were, until yesterday morning."

"That's not the way they tell it," Crandall retorted. "They say you and Keating have been out to get them ever since they were hired. You and your supervisors have been persecuting both of those men systematically. The fact that Burris has had grounds for all these previous complaints proves that."

"It proves that Burris has a persecution complex, and that Koffler's credulous enough to believe him," Melroy replied. "And that tends to confirm the results of the tests they failed to pass."

"Oh, so that's the line you're taking. You persecute a man, and then say he has a persecution complex if he recognizes the fact. Well, you're not going to get away with it, that's all I have to say to you." Crandall flung the test-sheet he had been holding on to the desk. "That stuff's not worth the paper it's scribbled on!" He turned on his heel in an automatically correct about-face and strode out of the office.

Melroy straightened out the papers and put them away, then sat down at his desk, filling and lighting his pipe. He was still working at 1215 when Ben Puryear called him.

"They walked out on us," he reported. "Harry Crandall was out here talking to them, and at noon the whole gang handed in their wrist-Geigers and dosimeters and cleared out their lockers. They say they aren't coming back till Burris

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and Koffler come back to work with them."

"Then they aren't coming back, period," Melroy replied. "Crandall was to see me, a couple of hours ago. He tells me that Burris and Koffler told him that we've been persecuting Burris; discriminating against him. You know of anything that really happened that might make them think anything like that?"

"No. Burris is always yelling about not getting enough overtime work, but you know how it is: he's just a roustabout, a common laborer. Any overtime work that has to be done is usually skilled labor on this job. We generally have a few roustabouts to help out, but he's been allowed to make overtime as much as any of the others."

"Will the time-records show that?"

"They ought to. I don't know what he and Koffler told Crandall, but whatever it was, I'll bet they were lying."

"That's all right, then. How's the reactor, now?"

"Hausinger says the count's down to safe limits, and the temperature's down to inactive normal. He and his gang found a big chunk of plutonium, about one-quarter CM, inside. He got it out."

"All right. Tell Dr. Rives to gather up all her completed or partially completed test records and come out to the office. You and the others stay on the job; we may have some men for you by this afternoon; tomorrow morning certainly."

He hung up, then picked up the communicator phone and called his secretary.

"Joan, is Sid Keating out there? Send him in, will you?"

Keating, when he entered, was wearing the lugubriously gratified expression appropriate to the successful prophet of disaster.

"All right, Cassandra," Melroy greeted him. "I'm not going to say you didn't warn me. Look. This strike is illegal. It's a violation of the Federal Labor Act of 1958, being called without due notice of intention, without preliminary negotiation, and without two weeks' time-allowance."

"They're going to claim that it isn't a strike. They're going to call it a 'spontaneous work-stoppage.'"

"Aah! I hope I can get Crandall on record to that effect; I'll fire every one of those men for leaving their work without permission and absence from duty without leave. How many of our own men, from Pittsburgh, do we have working in these machine shops and in the assembly shop here? About sixty?"

"Sixty-three. Why? You're not going to use them to work on the reactor, are you?"

"I just am. They're all qualified cybernetics technicians; they can do this work better than this gang we've had to hire here. Just to be on the safe side, I'm promoting all of them, as of oh-eight-hundred this morning, to assistant gang-foremen, on salaries. That'll take them outside union jurisdiction."

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"But how about our contract with the I.F.A.W.?"

"That's been voided, by Crandall's own act, in interfering with the execution of our contract with the Atomic Power Authority. You know what I think? I think the I.F.A.W. front office is going to have to disavow this. It'll hurt them to do it, but they'll have to. Crandall's put them in the middle on this."

"How about security clearance for our own men?"

"Nothing to that," Melroy said. "Most of them are security-cleared, already, from the work we did installing that counter-rocket control system on the U.S.S. *Alaska,* and the work we did on that symbolic-logic computer for the Philadelphia Project. It may take all day to get the red tape unwound, but I think we can be ready to start by oh-eight-hundred tomorrow."

By the time Keating had rounded up all the regular Melroy Engineering Corporation employees and Melroy had talked to Colonel Bradshaw about security-clearance, it was 1430. A little later, he was called on the phone by Leighton, the Atomic Power Authority man.

"Melroy, what are you trying to do?" the Power Authority man demanded. "Get this whole plant struck shut? The I.F.A.W.'s madder than a shot-stung bobcat. They claim you're going to bring in strike-breakers; they're talking about picketing the whole reactor area."

"News gets around fast, here, doesn't it?" Melroy commented. He told Leighton what he had in mind. The Power Authority man was considerably shaken before he had finished.

"But they'll call a strike on the whole plant! Have you any idea what that would mean?"

"Certainly I have. They'll either call it in legal form, in which case the whole thing will go to mediation and get aired, which is what I want, or they'll pull a Pearl Harbor on you, the way they did on me. And in that case, the President will have to intervene, and they'll fly in technicians from some of the Armed Forces plants to keep this place running. And in that case, things'll get settled that much quicker. This Crandall thinks these men I fired are martyrs, and he's preaching a crusade. He ought to carry an *advocatus diaboli* on his payroll, to scrutinize the qualifications of his martyrs, before he starts canonizing them."

A little later, Doris Rives came into the office, her hands full of papers and cards.

"I have twelve more tests completed," she reported. "Only one washout."

Melroy laughed. "Doctor, they're all washed out," he told her. "It seems there was an additional test, and they all flunked it. Evinced willingness to follow unwise leadership and allow themselves to be talked into improper courses of action. You go on in to New York, and take

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all the test-material, including sound records, with you. Stay at the hotel —your pay will go on—till I need you. There'll be a Federal Mediation hearing in a day or so."

He had two more telephone calls. The first, at 1530, was from Leighton. Melroy suspected that the latter had been medicating his morale with a couple of stiff drinks; his voice was almost jaunty.

"Well, the war's on," he announced. "The I.F.A.W.'s walking out on the whole plant, at oh-eight-hundred tomorrow."

"In violation of the Federal Labor Act, Section Eight, paragraphs four and five," Melroy supplemented. "Crandall really has stuck his neck in the guillotine. What's Washington doing?"

"President Hartley is ordering Navy personnel flown in from Kennebunkport Reaction Lab; they will be here by about oh-three-hundred tomorrow. And a couple of Federal mediators are coming in to La Guardia at seventeen hundred; they're going to hold preliminary hearings at the new Federal Building on Washington Square beginning twenty hundred. A couple of I.F.A.W negotiators are coming in from the national union headquarters at Oak Ridge; they should be getting in about the same time. You'd better be on hand, and have Dr. Rives there with you. There's a good chance this thing may get cleared up in a day or so."

"I will undoubtedly be there, complete with Dr. Rives," Melroy

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replied. "It will be a pleasure!"

An hour later, Ben Puryear called from the reactor area, his voice strained with anger.

"Scott, do you know what those—" He gargled obscenities for a moment. "You know what they've done? They've re-packed the Number One Doernberg-Giardano; got a chain-reaction started again."

"Who?"

"Fred Hausinger's gang. Apparently at Harry Crandall's orders. The excuse was that it would be unsafe to leave the reactor in its dismantled condition during a prolonged shutdown—they were assuming, I suppose, that the strike would be allowed to proceed unopposed—but of course the real reason was that they wanted to get a chain-reaction started to keep our people from working on the reactor."

"Well, didn't Hausinger try to stop them?"

"Not very hard. I asked him what he had that deputy marshal's badge on his shirt and that Luger on his hip for, but he said he had orders not to use force, for fear of prejudicing the mediators."

Melroy swore disgustedly. "All right. Gather up all our private papers, and get Steve and Joe, and come on out. We only work here—when we're able."

Doris Rives was waiting on the street level when Melroy reached the new Federal Building, in what had formerly been the Greenwich Village district of Manhattan, that evening. She had a heavy brief case with her, which he took.

"I was afraid I'd keep you waiting," she said. "I came down from the hotel by cab, and there was a frightful jam at Fortieth Street, and another one just below Madison Square."

"Yes, it gets worse every year. Pardon my obsession, but nine times out of ten—ninety-nine out of a hundred—it's the fault of some fool doing something stupid. Speaking about doing stupid things, though—I did one. Forgot to take that gun out of my overcoat pocket, and didn't notice that I had it till I was on the subway, coming in. Have a big flashlight in the other pocket, but that doesn't matter. What I'm worried about is that somebody'll find out I have a gun and raise a howl about my coming armed to a mediation hearing."

The hearing was to be held in one of the big conference rooms on the forty-second floor. Melroy was careful to remove his overcoat and lay it on a table in the corner, and then help Doris off with hers and lay it on top of his own. There were three men in the room when they arrived: Kenneth Leighton, the Atomic Power Authority man, fiftyish, acquiring a waistline bulge and losing his hair; a Mr. Lyons, tall and slender, with white hair; and a Mr. Quillen, considerably younger, with plastic-rimmed glasses. The latter two were the Federal mediators. All three had been lounging in arm-

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chairs, talking about the new plays on Broadway. They all rose when Melroy and Doris Rives came over to join them.

"We mustn't discuss business until the others get here," Leighton warned. "It's bad enough that all three of us got here ahead of them; they'll be sure to think we're trying to take an unfair advantage of them. I suppose neither of you have had time to see any of the new plays."

Fortunately, Doris and Melroy had gone to the theater after dinner, the evening-before-last; they were able to join the conversation. Young Mr. Quillen wanted Doris Rives' opinion, as a psychologist, of the mental processes of the heroine of the play they had seen; as nearly as she could determine, Doris replied, the heroine in question had exhibited nothing even loosely describable as mental processes of any sort. They were still on the subject when the two labor negotiators, Mr. Cronnin and Mr. Fields, arrived. Cronnin was in his sixties, with the nearsighted squint and compressed look of concentration of an old-time precision machinist; Fields was much younger, and sported a Phi Beta Kappa key.

Lyons, who seemed to be the senior mediator, thereupon called the meeting to order and they took their places at the table.

"Now, gentlemen—and Dr. Rives—this will be simply an informal discussion, so that everybody can see what everybody else's position in the matter is. We won't bother to make a sound recording. Then, if we have managed to reach some common understanding of the question this evening, we can start the regular hearing say at thirteen hundred tomorrow. Is that agreeable?"

It was. The younger mediator, Quillen, cleared his throat.

"It seems, from our information, that this entire dispute arises from the discharge, by Mr. Melroy, of two of his employees, named Koffler and Burris. Is that correct?"

"Well, there's also the question of the Melroy Engineering Corporation's attempting to use strikebreakers, and the Long Island Atomic Power Authority's having condoned this unfair employment practice," Cronnin said, acidly.

"And there's also the question of the I.F.A.W.'s calling a Pearl Harbor strike on my company," Melroy added.

"We resent that characterization!" Cronnin retorted.

"It's a term in common usage; it denotes a strike called without warning or declaration of intention, which this was," Melroy told him.

"And there's also the question of the I.F.A.W. calling a general strike, in illegal manner, at the Long Island Reaction Plant," Leighton spoke up. "On sixteen hours' notice."

"Well, that wasn't the fault of the I.F.A.W. as an organization," Fields argued. "Mr. Cronnin and I are agreed that the walk-out date should be postponed for two weeks,

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in accordance with the provisions of the Federal Labor Act."

"Well, how about my company?" Melroy wanted to know. "Your I.F.A.W. members walked out on me, without any notice whatever, at twelve hundred today. Am I to consider that an act of your union, or will you disavow it so that I can fire all of them for quitting without permission?"

"And how about the action of members of your union, acting on instructions from Harry Crandall, in re-packing the Number One Doernberg-Giardano breeder-reactor at our plant, after the plutonium and the U-238 and the neutron-source containers had been removed, in order to re-initiate a chain reaction to prevent Mr. Melroy's employees from working on the reactor?" Leighton demanded. "Am I to understand that the union sustains that action, too?"

"I hadn't known about that," Fields said, somewhat startled.

"Neither had I," Cronnin added. "When did it happen?"

"About sixteen hundred today," Melroy told him.

"We were on the plane from Oak Ridge, then," Fields declared. "We know nothing about that."

"Well, are you going to take the responsibility for it, or aren't you?" Leighton insisted.

Lyons, who had been toying with a small metal paperweight, rapped on the table with it.

"Gentlemen," he interrupted. "We're trying to cover too many subjects at once. I suggest that we confine ourselves, at the beginning, to the question of the dismissal of these men, Burris and Koffler. If we find that the I.F.A.W. has a legitimate grievance in what we may call the Burris-Koffler question, we can settle that and then go on to these other questions."

"I'm agreeable to that," Melroy said.

"So are we," Cronnin nodded.

"All right, then. Since the I.F.A.W. is the complaining party in this question, perhaps you gentlemen should state the grounds for your complaints."

Fields and Cronnin exchanged glances; Cronnin nodded to Fields and the latter rose. The two employees in question, he stated, had been the victims of discrimination and persecution because of union activities. Koffler was the union shop-steward for the men employed by the Melroy Engineering Corporation, and Burris had been active in bringing complaints about unfair employment practices. Furthermore, it was the opinion of the I.F.A.W. that the psychological tests imposed on their members had been a fraudulent pretext for dismissing these two men, and, in any case, the practice of compelling workers to submit to such tests was insulting, degrading, and not a customary condition of employment.

With that, he sat down. Melroy was on his feet at once.

"I'll deny those statements, categorically and seriatim," he replied.

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"They are based entirely upon misrepresentations made by the two men who were disqualified by the tests and dropped from my payroll because of being, in the words of my contract with your union, 'persons of unsound mind, deficient intelligence and/or emotional instability.' What happened is that your local official, Crandall, accepted everything they told him uncritically, and you accepted everything Crandall told you, in the same spirit.

"Before I go on," Melroy continued, turning to Lyons, "have I your permission to let Dr. Rives explain about these tests, herself, and tell how they were given and evaluated?"

Permission granted by Lyons, Doris Rives rose. At some length, she explained the nature and purpose of the tests, and her method of scoring and correlating them.

"Well, did Mr. Melroy suggest to you that any specific employee or employees of his were undesirable and ought to be eliminated?" Fields asked.

"Certainly not!" Doris Rives became angry. "And if he had, I'd have taken the first plane out of here. That suggestion is insulting! And for your information, I never met Mr. Melroy before day-before-yesterday afternoon; I am not dependent upon him for anything; I took this job as an accommodation to Dr. Karl von Heydenreich, who ordinarily does such work for the Melroy company, and I'm losing money by remaining here. Does that satisfy you?"

"Yes, it does," Fields admitted. He was obviously impressed by mention of the distinguished Austrian psychologist's name. "If I may ask Mr. Melroy a question: I gather that these tests are given to all your employees. Why do you demand such an extraordinary level of intelligence from your employees, even common laborers?"

"Extraordinary?" Melroy echoed. "If the standards established by those tests are extraordinary, then God help this country; we are becoming a race of morons! I'll leave that statement to Dr. Rives for confirmation; she's already pointed out that all that is required to pass those tests is ordinary adult mental capacity.

"My company specializes in cybernetic-control systems," he continued. "In spite of a lot of misleading colloquial jargon about 'thinking machines' and 'giant brains', a cybernetic system doesn't really think. It only does what it's been designed *and built* to do, and if somebody builds a mistake into it, it will automatically and infallibly repeat that mistake in practice."

"He's right," Cronnin said. "The men that build a machine like that have got to be as smart as the machine's supposed to be, or the machine'll be as dumb as they are."

Fields turned on him angrily. "Which side are you supposed to be on, anyhow?" he demanded.

"You're probably a lawyer," Mel-

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roy said. "But I'll bet Mr. Cronnin's an old reaction-plant man." Cronnin nodded unthinkingly in confirmation. "All right, then. Ask him what those Doernberg-Giardanos are like. And then let me ask you: Suppose some moron fixed up something that would go wrong, or made the wrong kind of a mistake himself, around one of those reactors?"

It was purely a rhetorical question, but, much later, when he would have time to think about it, Scott Melroy was to wonder if ever in history such a question had been answered so promptly and with such dramatic calamitousness.

Three seconds after he stopped speaking, the lights went out.

For a moment, they were silent and motionless. Then somebody across the table from Melroy began to say, "What the devil—?" Doris Rives, beside him, clutched his arm. At the head of the table, Lyons was fuming impatiently, and Kenneth Leighton snapped a pocket-lighter and held it up.

The Venetian-screened windows across the room faced east. In the flicker of the lighter, Melroy made his way around to them and drew open the slats of one, looking out. Except for the headlights of cars, far down in the street, and the lights of ships in the harbor, the city was completely blacked out. But there was one other, horrible, light far away at the distant tip of Long Island—a huge ball of flame, floating upward at the tip of a column of fiery gas. As he watched, there were twinkles of unbearable brightness at the base of the pillar of fire, spreading into awesome sheet-flashes, and other fireballs soared up. Then the sound and the shock-wave of the first blast reached them.

"The main power-reactors, too," Melroy said to himself, not realizing that he spoke audibly. "Too well shielded for the blast to get them, but the heat melted the fissionables down to critical mass."

Leighton, the lighter still burning, was beside him, now.

"That's not— God, it can't be anything else! Why, the whole plant's gone! There aren't enough other generators in this area to handle a hundredth of the demand."

"And don't blame that on my alleged strike-breakers," Melroy warned. "They hadn't got security-cleared to enter the reactor area when this happened."

"What do you think happened?" Cronnin asked. "One of the Doernberg-Giardanos let go?"

"Yes. Your man Crandall. If he survived that, it's his bad luck," Melroy said grimly. "Last night, while Fred Hausinger was pulling the fissionables and radioactives out of the Number One breeder, he found a big nugget of Pu-239, about one-quarter CM. I don't know what was done with it, but I do know that Crandall had the maintenance gang repack that reactor, to keep my people from working on it. Nobody'll ever find out just what happened,

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but they were in a hurry; they probably shoved things in any old way. Somehow, that big subcritical nugget must have got back in, and the breeding-cans, which were pretty ripe by that time, must have been shoved in too close to it and to one another. You know how fast those D-G's work. It just took this long to build up CM for a bomb-type reaction. You remember what I was saying before the lights went out? Well, it happened. Some moron—some untested and undetected moron—made the wrong kind of a mistake."

"Too bad about Crandall. He was a good kid, only he didn't stop to think often enough," Cronnin said. "Well, I guess the strike's off, now; that's one thing."

"But all those people, out there!" Womanlike, Doris Rives was thinking particularly rather than generally and of humans rather than abstractions. "It must have killed everybody for miles around."

Sid Keating, Melroy thought. And Joe Ricci, and Ben Puryear, and Steve Chalmers, and all the workmen whom he had brought here from Pittsburgh, to their death. Then he stopped thinking about them. It didn't do any good to think of men who'd been killed; he'd learned that years ago, as a kid second lieutenant in Korea. The people to think about were the millions in Greater New York, and up the Hudson Valley to Albany, and as far south as Trenton, caught without light in the darkness, without heat in the dead of winter, without power in subways and skyscrapers and on railroads and interurban lines.

He turned to the woman beside him.

"Doris, before you could get your Board of Psychiatry and Neurology diploma, you had to qualify as a regular M.D., didn't you?" he asked.

"Why, yes—"

"Then you'd better report to the nearest hospital. Any doctor at all is going to be desperately needed, for the next day or so. Me, I still have a reserve major's commission in the Army Corps of Engineers. They're probably calling up reserve officers, with any radios that are still working. Until I hear differently, I'm ordering myself on active duty as of now." He looked around. "Anybody know where the nearest Army headquarters is?"

"There's a recruiting station down on the thirty-something floor," Quillen said. "It's probably closed, now, though."

"Ground Defense Command; Midtown City," Leighton said. "They have a medical section of their own; they'll be glad to get Dr. Rives, too."

Melroy helped her on with her coat and handed her her handbag, then shrugged into his own overcoat and belted it about him, the weight of the flashlight and the automatic sagging the pockets. He'd need both, the gun as much as the

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light—New York had more than its share of vicious criminals, to whom this power-failure would be a perfect devilsend. Handing Doris the light, he let her take his left arm. Together, they left the room and went down the hallway to the stairs and the long walk to the darkened street below, into a city that had suddenly been cut off from its very life-energy. A city that had put all its eggs in one basket, and left the basket in the path of any blundering foot.

THE END

IN TIMES TO COME

The An Lab this issue mentions the past on a longer view—the past two hundred fifty issues of Astounding. Since our business is predictions of things to come, it would seem that we, of all magazines, should be able to predict the future of the magazine. Sorry; wrong slant on that one. You are asking for a prediction of predictions—sort of second derivative of the future. The one predictable feature of the future is, of course, change. Certainly, January, 1930 couldn't have predicted the magazine of January, 1951. If there is a 500th issue—H is for Hydrogen and Hate; D is for Deuterium and Death; Uranium and Plutonium are named for planets eternally dead and frozen—it will be a vastly different thing.

But next month we can predict; serials are back. We're starting "Iceworld," by Hal Clement—the story of an interplanetary narcotics agent forced to work on a world of unimaginable, biting cold, a frozen world where his air was a solid, ordinary metals became brittle with cold, and possessed of an atmosphere so virulently corrosive plastics shivered, cracked, and sloughed away. Of course, the agent came from a planet spinning some 100,000,000 miles from a blue-white super-giant star . . . which made some difference in his viewpoint!

As you may have guessed—the vote was for serials.

The Editor.

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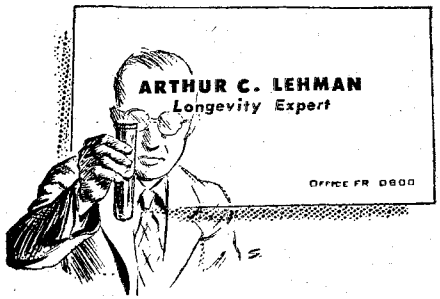
UNTITLED STORY



BY FRANK M. ROBINSON

The mayor bought a bottle of "cure-all water" — which was a silly sort of gag to fall for. But it wasn't a gag; it worked. And it was several thousand times more dangerous than ever he imagined . . .

Illustrated by Schneeman

"I'm afraid I've been a fool," the man said.

He was a big, rawboned Irishman and looked as solid as the oak desk he sat behind. A trace of white ran through his hair but he still didn't look his age.

His kind never do, Hayssen thought. They look like they can handle a hod full of bricks up to the day they die.

The man's name was Flaherty and he had a faintly worried look on his bulldog face. He ran a nervous hand through his hair and for a fleeting moment, with that gesture and his worried expression, he looked like he was honestly pushing the middle sixties.

"I *am* a fool," he added.

Hayssen shrugged his capable shoulders and looked interested. You didn't get to be mayor of a city like Chicago by being a fool.

The mayor cleared his throat and looked at the younger man intently.

"You know, when you get old, Hayssen, you want to believe in a lot of things. You want to believe so hard sometimes that you throw your common sense out of the window. You get a hardening of the cranial arteries, you get gullible. To be brutal, you become stupid. And I'm afraid that's what I've been."

Hayssen shooed invisible bugs off his hatband.

"They call it senility," he said, "but I don't think you're suffering

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from that — at least, not yet." He wondered what the snapper was going to be.

Flaherty hunched over his desk and lowered his voice, as if he was afraid somebody might be listening.

"I want you to do some investigating for me, Hayssen. But before I tell you what it's all about, I'd have to have your promise that you would keep it confidential."

Hayssen sighed. "The detective business is a confidential business, your honor. My clients' names and the reasons they hire me are kept strictly secret."

Flaherty seemed satisfied.

"I'll make it simple then and I won't apologize for myself. Two weeks ago I purchased a vial of radioactive water that's supposed to cure any disease and keep you healthy enough so you can live to be a hundred or better."

Hayssen had sense enough not to laugh. Flaherty, who had probably originated more crooked schemes than you could count, falling for something like this!

"It's none of my business," he said slowly, "but how come you fell for it?"

The mayor was looking older by the minute. Hayssen thought of the doomed expression that criminals have when they feel the hood drop over their face and the metal strips clamped over their shaved legs.

"You see, Hayssen," the mayor began in a tired voice, "life has suddenly become very precious to me. It's not too well known but I have a small cancer. It's in an inaccessible place for surgery and X rays would be dangerous.

"How much time I have left, I don't know. But I can't make plans in advance. If I want a vacation in California, I pack up and go. Tomorrow or a few months from now might be too late. And if somebody comes to me with a vial of radioactive water and says it will cure my cancer and help me live longer, I think twice before I throw him out as a crackpot. And if I have a particularly *bad* day" — he emphasized the "bad" slightly and Hayssen had a good idea of what he meant — "maybe I'll even buy it."

There was silence in the room and Hayssen felt vaguely embarrassed.

"What did you drop on it?"

"A thousand dollars." Flaherty managed to say it without flinching.

Hayssen uncorked a low whistle. It was, roughly, a tenth of the salary that Flaherty got as mayor. But then, Flaherty couldn't afford his car or the house he lived in on his salary either and he still got by.

"What do you want me to do, get it back?"

Flaherty waved the question aside with a blue-veined hand.

"The money's not important. The point is, it was a dumb thing to do. The people"—he coughed apologetically—"might think I was rather naive if word got around that I had dropped a grand on something like this."

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"In other words, it wouldn't do you any good if the loyal opposition got hold of the information, would it?"

Flaherty looked grim.

"I have every reason to believe that the opposition is behind it. It would be a neat trick for them to sell me the vial, then reveal the whole thing at election time."

"Have you anything substantial, any other reasons to think that it might be a political plot?"

Flaherty had anticipated the question. "Naturally. Shortly after I purchased the vial I received an anonymous phone call not to take it. The phone call implied that it might be a poison or a drug of some kind."

It didn't quite fit. "How do you get a plot out of that?"

"Consider. If I had taken the contents of the vial, nothing would have happened and I would know something was up or that I had been a sucker. But before I have a chance to take it, I get a phone call advising me not to."

Flaherty probably had political plots on his mind all the time but Hayssen granted him a point. "I think I see. If you had bought the vial and then regretted it, a phone call like that would make you think there might be something to it after all."

Flaherty nodded agreement. "Exactly. Reverse psychology. I wouldn't take the vial but I would still hang onto it, thinking that possibly it might be the real McCoy.

"But that's how I'm supposed to feel. Be indecisive and remain that way until the elections a few weeks from now."

Hayssen pulled at his ear. Politics was dirty but this was a new low.

"What do you want me to do about it?"

"Investigate the man who sold it to me. Find out who's behind it, what backing they have. Maybe we can figure out a way to turn the tables on them."

Flaherty rummaged around in his desk and finally came up with a card and a vial of thick, colorless liquid. He handed them to Hayssen.

"You might as well have the vial so you know what one looks like. The card gives his name and business address."

Hayssen read the card: Arthur C. Lehman, Longevity Expert. It gave an address in an exclusive part of town.

Flaherty looked like he had other things to do so Hayssen picked up his hat and coat and started to leave. He stopped at the door and looked back. He felt sorry for Flaherty. It was true that he ran a crooked city machine but Hayssen had seen times when it had been a lot worse.

And you couldn't help but feel sorry for a guy who could spell out the rest of his life in the ticks of his watch.

But business was still business.

"What's in it for me?"

Flaherty didn't look up. "The

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price of the vial and maybe more."

Hayssen had to hand it to him. Flaherty was willing to pay for his mistakes.

He closed the door softly behind him. He was facing outwards, into the room where you cooled your heels until Flaherty got ready to see you. Flaherty's secretary was writing something down on a pad. She hadn't heard him.

He let the knob turn in the lock with a soft click. Her hand darted toward a box on her desk and then she was relaxed and poised once more.

He walked up to her desk and stopped. He coughed politely and she turned toward him, her face friendly.

"You were in there a long time," she drawled. "Howd'ja come out?"

"Swell. I bought the Outer Drive for only ten bucks and the cost of mailing."

"That's kind of high," she said. "Last week he was offering it for five."

She said "five" like a telephone operator does.

And it was the voice that got him. Offhand, it sounded like a good grade of Brooklynese with a trace of some other accent. Just a trace of a strange accent that he had never heard before.

He took a good long look at her and felt sorry about being sarcastic. She was a nice-looking girl, even sitting down. Very nice. He made a mental note to write Rose La Rose a letter and tell her she'd have to find somebody else to dream about her.

"I'm sorry," he said contritely. "I've been listening to too many detective programs."

She showed her teeth in a pearly smile. They were nice white teeth and he even forgave the chewing gum. It probably helped keep them that way.

"It isn't polite to stare," she said.

"I was only wondering what your name was." The frank approach was always the best.

She pointed to a triangular sign on her desk that read *C. Cooper.*

"The C stands for Cathrinxa."

"Never heard of it."

"My folks named me after a famous actress," she answered, and then suddenly bit her lip.

"I'll call you Catherine. And look, I'm sorry about that wisecrack. Next time I come up to see hizzoner I'll bring along a package of gum as a gift offering. O.K.?"

"O.K.!" Her eyes were laughing and he couldn't help but think they were the clearest blue he had ever seen.

"What's *your* name?" she asked. The card he had presented listed the agency name, not his own.

He felt like a heel. She was getting a big kick out of this. It was a shame that it wasn't going to last.

"Donald Hayssen," he said slowly. "But I thought you knew. You've been listening to the mayor call me by it for the last half hour."

He leaned over and threw the

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switch on her intercom box. The click was a nice sharp noise in the room.

"Big Mike's kind of careless, isn't he?" He said it half apologetically.

The look on her pretty face told him what she was thinking. In her mind's eye she was feeding him to the vultures. Piece by piece.

Hayssen sniffed the air and listened to the satisfying crunch of his shoes on the dry leaves that lay on the sidewalk. The air was filled with wisps of smoke from smoldering piles of half-burned brush.

Just dusk, he thought. The time of early evening when the last touch football game has broken up. Supper time, when all the kids are washing up and the old man is starting to relax in his easy-chair, ready for his pipe and slippers.

He stared at the warm, friendly windows of the houses he was walking by.

The time of early fall evening when every bachelor wishes he wasn't one. When girls like Catherine Cooper really got under your skin.

He shook his head angrily and stomped up the walk to the apartment house where he lived.

He heard the phone ringing before he even got the door key out of his pocket. It was a long, wailing ring. The kind that tells you the operator has been buzzing your number for the last hour because someone was being downright mean and insistent about it.

He flipped his hat on an end table and picked up the phone. The voice at the other end of the line sounded muffled, like it was being strained through two layers of handkerchief.

"Is this Mr. Donald Hayssen?"

"I live alone and don't like it," Hayssen said. "Were you expecting someone else?"

The voice was annoyed. "Just a warning, Mr. Hayssen. Stay away from your liquor cabinet and don't touch your bed."

"I'm sorry but I don't like to sleep on the floor!" Hayssen snapped.

He banged down the receiver disgustedly. One of the joys of being a private detective. Like being zoo keeper on April 1st when all the wise guys call up and want to talk to Mr. Lion and Mrs. Tiger.

Sir Jock, his little Scottish terrier, was at his feet, whining and barking.

"You should be glad that you're not a detective, Jock," he said musingly. "All kinds of people calling you up and trying to get your goat. Sometimes I wish I had shaggy ears like you so I couldn't hear them."

He went to his bedroom and started to strip for a shower.

"I'm not supposed to sleep in my bed tonight, Jock. Imagine that! I suppose I should use a park bench, instead."

He was in the shower now, soaping up. Jock was in the doorway to the bathroom, his ears pricked up and head cocked. Hayssen scraped

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some of the suds off a muscular arm and flicked them at Jock.

Jock backed away and barked.

"That's no way to act, Jock. And come to think of it, you weren't your old exuberant self tonight when I came home. No jumping all over me, like you usually do."

He was out of the shower, toweling himself.

Jock was still whining and acting very strange, like he had ever since Hayssen had come home.

Hayssen walked to the back door and opened it, shivering slightly as he felt the cold air against his damp skin. "Want to go out, Jock?"

Jock didn't go near the door.

Hayssen shrugged and went into the bedroom and rummaged around in his drawer for some clean underwear. He put on his shorts and turned to face the bed. It was a very ordinary bed, with a plain blue and white chenille spread.

"Look at that bed, Jock! Did you ever see a more ordinary bed in your life? But I shouldn't sleep on it. I suppose I shouldn't eat either."

He knotted his tie and strolled over to the bed.

Jock whined and barked and pulled at Hayssen's trousers.

Hayssen looked at him closely. The dog was frightened of something, he couldn't deny that. Had somebody been in his apartment?

It wasn't impossible, he supposed.

He knelt down and scratched the dog's ears. "What's wrong, Jock? Is there really something wrong with the bed?"

He turned and lifted up a corner of the spread and peered under the bed.

"There's nothing underneath the bed, Jock, nothing at all."

Jock apparently wasn't satisfied.

Hayssen was puzzled. "I can't understand you, Jock." He turned and started to sit down on the bed when Jock, with an anguished whine, jumped on top of the spread and barked a warning.

It was the last jump that Jock ever made. The spread on the bed suddenly closed in on him like a Venus flytrap does on a fly. The spread rolled itself up into a tight, hard ball and Hayssen could hear cracks like somebody snapping twigs.

There had been a muffled yelp at the very start and then nothing. After that the bundle seemed to relax slightly and the spread started to soak up red, like a blotter.

Hayssen stared at the quiet bundle in disbelief. It had happened so suddenly, without a moment's warning. And Jock—

Jock.

He made it to the bathroom just in time. He stayed there a while, then thought of Jock and forced himself to go back in the bedroom. The bundle was still there, stained and relaxed looking. He got a book and threw at it. Nothing happened. He came closer and wriggled a corner of the fabric loose.

It had silvery threads of something running through it, threads that were probably made of some sort of spring steel. But a spring

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steel like nothing he had ever known. The spread had been "set," like a web, to react when something fell on it or touched it.

Or sat on it, to take off its shoes and socks.

He felt sick again, with the sickness of sheer, horrible fright.

Something like himself.

The phone call had been on the level then. Somebody had been in the apartment and rigged it for him. Jock knew something was wrong and had tried to tell him when he came home.

The phone call wasn't altogether right, though. He didn't have a liquor cabinet.

Hayssen felt a cold shiver go down his spine.

No, he didn't have a regulation liquor cabinet. He used the storage space in his radio cabinet that was meant to hold phonograph records. It was neatly fitted out with glasses and a bottle opener and a few bottles of cheap Scotch and fixings.

He went into the living room and inspected the radio cabinet. There was nothing on the outside that indicated anything was wrong.

He got a coat hanger, one of the wire kind, from the clothes closet and untwisted the top and straightened it out. He formed a little hook on one end of it and wriggled open the door of the cabinet while he stood to one side.

There was a thin, violet, fan-shaped flare of light that streamed at an upward angle from the open cabinet. Then something on the inside gurgled and died in a flash of reddish flame.

At first nothing in the room seemed touched.

An end table had been in the path of the flash and Hayssen went over and inspected it. There was a thin, fine line cut diagonally through the top. He touched the table and it shivered slightly and fell in two along the cut line. The cut surface was as smooth as the surface of a Johansen Gauge block.

His hat had been on the table and he picked it up. It was cut, too, on a diagonal line that went from the hatband through the crown.

The beam had fanned out and cut slightly into the wall facing it. A picture lay on the sofa. The beam had cut the wires that held it.

Hayssen stood in front of the cabinet and looked down. The bottles had been shoved toward the back and a tiny piece of apparatus had been placed in the cleared space.

There was nothing left of the apparatus now but a fused lump of metal.

He made an estimate and bent over, like he would if he was going to open the cabinet.

The beam would have caught him right at the neckline.

He sat on the sofa and thought over the events of the day before he had come home. There was only one that stood out.

Flaherty and his vial of radioactive water that was supposed to guarantee good health and long life.

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Maybe Lehman or one of his associates wasn't anxious that he should be looking into their affairs.

But then, they weren't supposed to know about it yet, either.

He went to the cabinet and got himself a tumbler of whisky. Somehow, they had known that he was going to investigate them. Somehow he had become dangerous to Lehman and his mob.

But how had they known that he was after them? How?

Naturally.

Flaherty's very pretty—and very curious—secretary. She had listened in on the conversation. She was the only one besides Flaherty and himself who knew what he was after.

And there was the phone call he had received. A feminine voice, even though it was husky, muffled by the old gag of placing a handkerchief over the mouthpiece.

A feminine voice with an accent, he recalled. An accent like Catherine Cooper's.

There was a C. Cooper listed in the telephone book and he dialed the number. She was home.

His voice was ragged and he made a mess of asking for a date.

She was coy. What made him think she didn't have a date? Besides, and her voice became frosty, she was sure he wouldn't like going out with a girl who was addicted to eavesdropping.

He hated to use it but this time it was true.

"Cathy, I have to see you! It's a matter of life and death!"

Whose, she wanted to know.

"Mine! And I'm strictly on the level."

On second thought, she'd be glad to go to dinner since she hadn't eaten yet. She had been busy washing a pair of stockings. Any place would be O.K.

He put down the receiver with a relieved feeling. She hadn't eaten yet. And she hadn't been preparing a meal for somebody else.

For what it was worth, Catherine Cooper wasn't married.

She was wearing a blue nylon dress and a short, gray fur coat. They went real well with her blue eyes and soft, shoulder length blond hair.

Hayssen noted that she seemed to approve of everything. He supposed that she had been expecting one of those cozy little neighborhood cafés that specialize in red table cloths and homemade spaghetti.

He hoped that she was cheerfully disappointed. It was a high-class chromium-plated place that specialized in red leatherette booths, thick steaks, a small floor show, and high prices.

It was just the place to oil up a secretary if you wanted some information.

It was also just the place, he realized, to make a hit with a pretty blonde.

After they had eaten, he got down to business.

"What do you know about Arthur

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Lehman?" he asked casually.

Her face was vacant.

"Am I supposed to know something about him?"

She was pretty, Hayssen thought. She had a quick wit and a nice figure and even had a vaguely planned place in his future.

She had also listened in on his conversation with the mayor about Arthur C. Lehman. And shortly after that, somebody had tried to kill him in several ingenious ways.

"I'll refresh your memory," he said stiffly. "I had a talk with hizzoner today about something that one Arthur C. Lehman sold him. You listened to that conversation. When I got home tonight somebody tried to kill me. I'm just smart enough to think there's a connection between you and Lehman and that you tipped him off that I was interested in him.

"How's that? Good enough for a first try?"

She hadn't changed her expression.

"All right—I listened. But only if you say so."

She was going to play dumb, he thought, and deny everything.

"It's not my own life so much, Cathy, it's other people's too. Lehman is no pitchman peddling flukum and ink sticks on the street corner. Sure, it might be just a political plot. But Lehman might have approached other people on it. Do you think it's right to play on a person's fear of death and disease to bilk them out of a thousand dollars at a crack? So Flaherty can afford it. There might have been others who couldn't."

The life-is-grim, life-is-earnest routine might get more out of her than trying to face her down, Hayssen thought.

Her face was impassive.

"Do you feel as sorry as this for the people who buy silver polish and fountain pens from your pitchman?"

"Look," he said. "I used to have a little Scottish terrier at home named Jock. He was a friendly dog and because I fed him every night and took him for walks in the park, he grew to like me. He liked me so much the mutt gave his life trying to protect me. He didn't have a chance. Right now he's a crushed bundle of gristle and blood and fur.

"And if I had felt like a drink when I first came home tonight, the coroner would have thought the French Revolution had taken place in my apartment."

Her eyes were questioning and he gave her the whole brutal story of what had happened. He was pleading with her, he realized, something he hadn't planned to do. Her face was a picture of conflicting emotions and he tried to press his point.

"Cathy, when I called up tonight and you answered the phone and heard my voice, I thought you sounded a little relieved. Like you were glad I was calling. Like you were glad I was still alive."

She sipped her drink quietly.

Hayssen stared at her grimly and then on impulse reached over and took her purse before she could ob-

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ject. He went through the contents very quickly and found what he wanted, loosely crumpled in a corner. He had figured out that she would be in a hurry and forget to check little details. He had been correct.

He took the handkerchief and placed it on the table. It was a clean handkerchief and had a faint circle indented on it, with little wrinkles running out from the circle's edge.

"Thanks anyway for calling. You saved my life. You see, I recognized your voice even though muffled by a handkerchief. You've got a cute accent that's hard to disguise."

There was a sudden fear in her eyes, he thought, and a touch of pity.

"Why don't you leave it alone, Don? You can call Flaherty and turn down the assignment. Give him back his vial and tell him you're not interested in finding Lehman. Couldn't you do it, Don? For me?"

Hayssen's lip curled. It sounded like the punch line in a B movie.

"If you want to help me so much, why not tell me what it's all about?" he urged. "You're too nice a girl to be mixed up with guys like Lehman."

Her face mirrored the fighting that was going on inside her.

"I would like to but I can't. I can't!"

He picked up the check.

"You can play it that way if you want but to me it's as thin as a bowl of restaurant soup. You know something and you won't tell me. Too bad Jock didn't feel the same way."

He walked out. He didn't look back.

He went home and dug in the back yard for a while and then spent the rest of the night in the local Y.M.C.A. He didn't sleep well; Jock and Flaherty and Cathy haunted his sleep.

The next day he went downtown and called the local branch of the Better Business Bureau. They had never heard of Arthur C. Lehman, Longevity Expert. He tried several headings under health and old age and pulled a blank there, too.

By one o'clock he was in the City Hall outside the license bureau, waiting for the public servants to come back from lunch.

At one thirty he had littered the marble floor with cigarette butts. Five minutes later a short, pudgy character in his late forties showed up, stared at the butt-littered floor in disapproval, and reluctantly opened up the license window for Hayssen's benefit.

Hayssen flashed a tin badge and tried to look official.

"Didja ever issue a license to a guy named Arthur C. Lehman. He's a"—Hayssen studied the card as if it had just been handed to him a few minutes before—"longevity expert, whatever that is."

"Long what?"

Hayssen spelled it out and the pudgy man disappeared for a moment. He came back shaking his head and looking relieved that

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Hayssen would leave now.

Hayssen didn't.

"Try under Health then."

It was just a guess that Lehman might be running a health salon of some kind at the address he had given.

The pudgy man came back this time with a piece of paper, heavily stamped and certified. Hayssen reached for it but the pudgy man held it back.

"I'm not so sure you have the authority—"

Hayssen took the cigarette out of his mouth and stared at him as if he had just crawled out from under a rock.

"Do ya like your job here, Charlie? Ya know ya could be obstructin' justice and—"

The pudgy man bleated and handed over the license without any more argument.

The license didn't say much, just authorizing one Arthur C. Lehman to run a health salon at such and such an address. A photograph of Lehman was attached. It was not an unusual face. You could run into it three times a day and it would never stick in your mind. Rather thin, balding, pleasant face. Glasses.

There was an affidavit attached to it that gave a little more information. He had done business in a suburb before this. The same suburb that was listed as his home town. A Martin Green, of the same town, was down as a reference.

Hayssen handed the certificates back, grunted a "thanks" and left.

The suburb was an old German settlement; old homes and a lot of taverns with German names. The address listed for reference was on a shady side street. The gingerbreading on the outside dated the house as having been built before the turn of the century.

There was a separate entrance for Martin Green. Hayssen walked up the stairs and leaned against the buzzer.

The character who answered the bell was portly and dignified with the type of pompous face that usually graces a bank board meeting. He was all decked out in a bathrobe and slippers and carrying the afternoon paper in his hands.

"Something I can do for you?" His voice wasn't overly friendly and it carried a slight accent.

Hayssen flashed his badge again and then abruptly wished he hadn't. Green looked like he might be the type who would insist on seeing credentials.

"Just a little checking I would like to do; nothing serious."

"Certainly. Come right in and make yourself comfortable." He was being nice to Authority, Hayssen thought. Authority always played on the side of people like Green anyway.

Hayssen walked in and found an easy-chair to sit in. He looked around the apartment while Green was picking some papers off of another chair. The room was rather modern in style. Blond furniture, a brand-new radio-television set. Expensive wall hangings. All in all a

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rather modern room that had become comfortable through use.

"Sorry to have to trouble you," he started, "but I'm looking for information about an Arthur Lehman. What kind of business he's been in, what kind of"—he coughed discreetly—"credit rating he might have. You see, I'm in the—"

Green held up a genial hand. "You don't need to explain further, Mr. . . . ah . . . Mr.—"

"Hayssen." He pronounced it very carefully. It wouldn't hurt to give his name. If Green insisted on a check, it might stand him in good stead to give the same name that was on his driver's license.

"Well, you hardly need to worry about Lehman. He's a very intelligent man when it comes to handling money."

"I rather wondered about his standing in the community, Mr. Green. You know, if he's done business here before and what kind of a reputation he's had."

"Oh yes, Art's been established in this community for a long time. Excellent health business, very good organizer. As I understand it, the businessmen around here thought very highly of him. Member of the Elks and the Masons. Very good man."

Hayssen beamed. "Well, that's the kind of information I like to get hold of, Mr. Green," he lied. "You've been a big help to me, a big help. It's nice to be able to finish up the business so soon."

Green was on his feet, holding open the front door. "Anything to be of service, Mr. Hayssen. You'll never go wrong backing Arthur Lehman."

That's what you say, Hayssen thought.

They shook hands and he left.

It was queer, Hayssen thought. So neat a reference that actually wasn't a reference at all. And it was nice that Green had been home that afternoon. Of course, maybe he had shift work. Except a guy like Green wouldn't be working in a factory.

And Green himself. A character right out of Sinclair Lewis' "Babbitt." But why should a guy like Green be renting a tiny apartment in an old run-down house?

Green looked like the type of guy who should own the whole block.

An hour later Hayssen was sure the afternoon was going to be filled with unpleasant surprises.

The local Chamber of Commerce had no record of Lehman.

The Elks had never heard of him. Neither had the Masons.

The local grammar and high schools had no record of him.

Hayssen went back to Green's address. There was no answer to the buzzer. He knocked on the door. No answer. He knocked harder.

"What do you want? What are you making so much noise for?"

An elderly lady with a heavy German accent had opened the door downstairs and was peering up the dimly lighted hallway.

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"I want to see Mr. Green," Hayssen said.

"No Mr. Green lives here." Her voice was flat. "I think you have the wrong address."

"But I just talked to him a couple of hours ago!"

She came up the stairs, slippers making a slapping sound on the treads.

"I tell you that Mr. Green doesn't live here! Maybe a month ago a Mr. Green came around and rented the apartment but he never moved in." She shrugged. "I do not understand it at all. But he paid good money and we've let it go vacant thinking he might come any day, but so far he hasn't."

She squinted at him closely. "Maybe you would like to see the apartment? Maybe you would like to rent it for yourself?"

She put the key in the lock and then hesitated again. "It is not furnished, however. We didn't have enough furniture to put in this apartment too."

Hayssen felt his skin turn clammy. Not furnished.

But Green had had a lot of modern furniture and rugs and wall hangings!

The old lady was saying something. "The size of the room doesn't matter to you, does it?"

"Size?"

She was fiddling with the key. "Mr. Green said he wouldn't rent it if it was any smaller than fourteen by sixteen feet."

The door swung open and her hand found the wall switch and flicked it.

The room was as empty as his hopes. The plastered walls were bare and a small leak in the roof had discolored the ceiling. There was no sign of a carpet or any furniture.

"Thanks for letting me see it," Hayssen said in a strangled voice, "but I don't think I'll take it. Like you say, maybe Mr. Green will show up any day now."

He walked out into the night feeling like he had been sandbagged.

He stood well back in the doorway, in the shadows, watching who came down the corridor. He should have done this sooner, he thought. Shadow Lehman's office and watch who went in and came out.

The building was small, one of those reconverted homes on Rush Street, and there weren't many offices to a floor. There was a loan office at the end of the hall and a walk-up beauty parlor a door down from that. Lehman's office was the next one down, directly across from the elevator. A milk organization that specialized in educating people to drink milk in preference to coffee, beer or water was the only other office on the floor. The doorway Hayssen stood in gave access to a fire escape.

He had been standing there for well over an hour and no results. A few people had gone to the loan office, a brunette who didn't need it had patronized the beauty parlor, and the milk man had stepped out

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for lunch and a quick one at the corner tap.

He tensed and then relaxed. False alarm. Another customer for the beauty parlor.

Fifteen minutes later a janitor carrying a bucket came down the hall and stopped in front of Lehman's office. He started doing something to the sign on the door. Hayssen swore softly and walked over.

The man was chipping away at the neatly lettered sign with a razor blade.

"Mr. Lehman move?" Hayssen asked in a friendly fashion.

The janitor looked up.

"Yes, sir! Mr. Lehman musta moved out some time yesterday. Called up this morning to say he had left."

He started chipping away at the "h" in Lehman.

"Moved kind of suddenly, didn't he?"

"He sure did! Why you know, he had files and cabinets and office machinery and I swear I never saw anybody take them out. Yes, sir, he just upped and disappeared." He looked at Hayssen half suspiciously. "You have an appointment with him or something?"

Hayssen laughed. "Oh no! I was looking for office space and the building manager sent me up here to look at this one, see if I wanted it." It seemed to be the thing to say if you wanted to look at a room or an office lately.

The janitor got out a key and opened the door. Hayssen followed him in and looked it over.

"Did this, ah, Lehman fellow do much business here?"

The janitor scratched his head. "I think maybe that's why he left. I never seen anybody come up here to see him. Course I didn't watch all the time, but it seems to me he never did much business at all."

Hayssen went to the window and looked out. Nice view; you could see over to Michigan Avenue and the lake beyond.

He looked back in the room and then suddenly knelt down by the baseboard. The outlet plug had a little cap over it, the kind that keeps dust and dirt from accumulating. The other plugs had caps over them, too.

"Did you put the caps back on the outlet plugs when Lehman left?"

"No, sir! I haven't been in here since Mr. Lehman left!"

"Do you know of anybody else who would have?"

The janitor looked thoughtful. "No, sir, I don't."

Hayssen looked back toward the window and gasped. He hadn't noticed it when he came in but there was a thin covering of dust on the floor, marred only by where he and the janitor had stepped.

"Was this space vacant for very long before Lehman rented it?"

"About six weeks, but that's all." The janitor looked concerned. "Is there something wrong? Mr. Lehman in trouble?"

"Maybe." Hayssen found a bill in his pocket and held it out to the

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janitor. Money might do more in this case than flashing his badge would. Besides, some day somebody would investigate that badge of his and find out he had got it for so many boxtops and the cost of mailing.

"What do you know about Lehman? What kind of a guy is he?"

"Well, just sort of an average fella. Medium height, mebbe a little taller than average. Kind of, well, plain lookin'. Didn't dress fancy or anything."

"Just the all-around, typical businessman," Hayssen said disgustedly. He wished he had the bill back.

"Look, you already told me that he didn't do much business. Do you remember anything else peculiar about him?"

The janitor brightened. "Well, yes, I do! I remember when he moved in he got a tape measure and measured the office. I asked him why and he said the office had to be at least fourteen by sixteen. I thought that was kind of odd but naturally I didn't say anything."

The janitor looked around the office again. "Yes suh, it sure beats all how having cabinets and files and things makes an office look *smaller.*"

Lehman had wanted an office at least fourteen by sixteen, Hayssen thought.

And Martin Green had wanted an apartment at least fourteen by sixteen before he would rent it.

And both of them had seemed able to move without the benefit of any moving company.

Later that afternoon Hayssen went to a local chemist he knew who did research and analysis for various hospitals. He kept some guinea pigs on the premises and Hayssen left him with a small portion of the contents of Flaherty's vial and specific instructions as to just how to use it.

It might be foolish, he thought, but he wouldn't be satisfied until he had tried it.

It was almost dark when he got to his office. He leafed through the mail and then pulled open a drawer and took out a tumbler and a bottle of cheap bourbon. He poured himself half a glass and settled back with a sigh.

Take a mayor with cancer who bought himself a vial of atomic water and then changed his mind and claimed it was a political plot. Add someone who liked to kill people with fine steel springs or else guillotine them with a pretty fantastic snicker-snick, and mix thoroughly with one Martin Green who had rented an apartment and then never used it—except when Hayssen came to see him for about fifteen minutes one sunny afternoon.

Sprinkle lightly with somebody who rents an office but never used the electric outlets and doesn't muss the dust that was left on the floor from a previous six-week vacancy, and add one curious blonde who could probably straighten out the

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whole mess if she wanted to.

And the result of it all was a severe case of heartburn.

He could call her, Hayssen thought. He could call her and apologize and try another way.

But no, that wouldn't do. It was up to her to call him.

The phone rang.

He grabbed it eagerly.

It was Flaherty. Hayssen was to drop Lehman. No, no. There was no explanation.

He stared at the phone in disbelief. "I'm sorry," he said slowly. "I'm sorry but I can't do it."

A little later he washed up in the mop closet down the hall and left.

He left just a moment too soon to hear his phone ring with an agonizing insistence.

"Rather cold tonight, isn't it, sir?"

The boy was looking up at him with sightless eyes of gray.

Hayssen grunted, took his paper, and dropped a quarter in the newsboy's hand. It must be tough, he thought, to be blind like that.

Ten minutes later, after changing street cars and jostling through the crowds, he sensed that he was being followed.

There wasn't much that he could pin it on. A familiar bit of cap that followed in the crowds when he transferred, a swift glance at a face that he had seen before.

A dogged animal awareness as much as anything else.

He got off in his home block and casually inspected the people on the walks. Whoever it was who had followed him had given up. There was a pushcart peddler at one end of the block whom he didn't remember ever seeing before but then there were no laws against pushcart peddlers.

The others on the walk were hurrying for home through the chill night. Rather less than the usual number, he thought, but then he had spent a lot of time changing streetcars and dodging into doorways, trying to shake his elusive follower.

He stopped in a corner grocery store.

What every young bachelor gets to know: How to cook for himself. He idly wondered how good a cook Cathy Cooper was.

He picked out enough cans to get a supper together and took them to the counter. The clerk was a new one. They talked about sports and politics and inflation, the usual chitchat you mull over with shopkeepers and hired help.

There was something odd about the clerk, Hayssen thought. Something about him, in a way, was familiar.

The clerk was putting the cans and the bottles and the packages of meat into a bag. He finished with the packing and looked up.

"You're sure there's nothing else, Mr. Hayssen?"

Hayssen started. He remembered now.

The accent.

The same peculiar accent that

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Catherine Cooper had. And Martin Green.

And how had the clerk known his name was Hayssen? He didn't remember giving it. And the clerk was new.

"No," he said slowly. "I don't need anything more."

He took the bag of groceries and started for the entrance. He had a view of the street through the plate glass window at the front. There was nobody on the street now. Nobody but the pushcart peddler and a newsboy on the corner and what looked like a cop on the beat.

The newsboy was familiar.

The same newsboy who had sold him a paper outside his office a half-hour ago. The familiar bit of cap he had seen so often on his way home, the face that had followed him.

And he would never have thought of the newsboy because the newsboy had pretended he was blind.

Gray contact lenses and a winning personality.

It had been very clever.

The clerk was at the front door, standing in front of it like Horatio at the Bridge. And just as determined. A slim, delicate looking pistol had appeared in his hand.

"I think you better wait here, Hayssen."

Just like Riverview, Hayssen thought. A thrill every minute.

He threw the bag of groceries at the clerk and chopped at him roughly with the side of his hand.

There was a grunt of pain and then Hayssen was through the door and legging it across the street for his apartment building. A voice trailed after him yelling "Stop!"

The fake cop was heading for him now, pulling at his holster.

A thin beam of violet colored light cut through the chill air on Hayssen's left. It splashed against a brick wall and Hayssen spotted a little charred hole in the bricks before the beam snapped off.

He was in the apartment building now, safe in the elevator.

Safe.

"You were in a hurry, Mr. Hayssen. Anything wrong?"

He could feel his hackles rise.

The fat little man who operated the elevator was new to him. Too new.

He turned and rabbit-punched the operator, then grabbed the controls and shot the cab up to the fifth floor.

He was out of the elevator and heading down the hall for the stairway that led to the roof. The door wasn't locked and a moment later he was on the pebbled roof, momentarily silhouetted against the velvet sky.

A flash of purple light ate away a piece of the cornice and he dropped flat to the roof. He could hear feet pounding on the stairway leading up.

He rolled to the rear of the building, safe for a moment in the shadows. Ten feet below him was the top of the fire escape. He let himself over, trying to grip the slippery

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edge of the cornice, hung for a moment, then dropped to the escape. The fall jarred him and he could feel the warm ooze of blood in his mouth where he had bit his tongue.

A moment later he was running quietly down the escape, slipping noiselessly past lighted windows where other tenants of the building were eating or playing cards or watching the television.

He could hear men searching the shadows above, looking behind the chimneys and the squat little shack that housed the top of the roof stairway.

Looking for him.

He was almost to the alley before one of them poked his head over the roof and hissed to his companions.

Hayssen was in the alley now, dodging down it for dear life. There was the clatter of men on the fire escape and soon they were padding silently after him.

They had seen him!

There was a flash of light and Hayssen dodged frantically. A thin smoky line appeared on a garage behind him.

He ducked through a backyard and headed for an apartment construction project, half a block away. Maybe he could lose his pursuers in the maze of lumber, cement, steel beams, and workmen's shacks that dotted the site.

At least he could gain time. Time enough for startled housewives and property owners to call the police.

With a sinking feeling he knew his pursuers knew it, too. They wouldn't be careful now. They would be out to get him as soon as they could.

What a sucker he had been. He had always considered that he had a slight margin of safety, that Cathy would warn him when his life was in danger, when Lehman's hoods were after him.

Fools are made, he thought.

And fools are buried.

He ducked behind a small mound of cement bags and sat down, breathing heavily. He could hear the others moving noiselessly about in the lot. Their whispering and the creak of boards as they walked across them carried well through the night.

A thin film of sweat covered his face and he brushed at it with his coat sleeve.

An alley cat wailed for a second and then was abruptly quiet in a sudden flash of violet.

A beam of light appeared a hundred feet away but Hayssen couldn't see anybody behind it. They were using some new kind of flashlight, he realized. Beams of light that didn't flare straight ahead but could curve and probe around corners.

A sudden dazzle of light showed over the top of the cement bags and there was a light rustle as a thin wire arched over the top. He moved out of the way just in time and watched the wire coil tightly around the bags and cut into them. Dry ce-

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ment spurted from the bags and he dodged over to a stack of lumber.

Moments later the men who had followed him were clustered around the spot where he had been. They inspected the ground and a low murmur of disappointment came from them.

He thought of his gun with regret. It was back at his apartment, carefully hidden under clothing in his bottom drawer.

He felt along the ground and located half a brick.

He hefted it casually. This was for Jock.

The brick was well-aimed. It hit the newsboy and there was a sudden scream of anguish.

They were after him again, throwing away all pretense at stealth and openly flaming piles of lumber and steel beams. Lights were going on in the houses around the project and Hayssen prayed that somebody would call the cops.

He was running parallel to a half-built brick wall. An I-beam lay on the ground, jutting out from the wall, and he fell over it. Pain twisted his face and he could feel the ligaments near his ankle tear.

In the distance he could hear the faint scream of sirens.

They would get there just in time to list his name with the other unsolved murders of the year, he thought.

A beam of light curled around the side of the wall and dazzled his eyes. There was a shout from one of his pursuers and then they were clustered around him.

He couldn't make them out. They were formless shadows, standing in back of the circle of light cast by one of their flashlights.

The police sirens were a lot nearer.

The shadowy figures scattered and one of them flicked a violet beam along the wall, at an upward angle so the cut would be on a slant.

The top of the wall hung there for a moment before it came crashing down on him.

The wail of the sirens sounded dimmer and then faded out altogether.

"Here, drink this," a voice commanded.

Hayssen felt the lip of a glass press against his mouth and he swallowed automatically. The liquid was sweet and a trifle oily. After taking it, his head felt oddly clear and yet thick at the same time.

He was lying on a couch in an office. The man who had offered the glass of liquid looked familiar. Rather thin and balding with a pleasant face. Glasses.

"My name's Arthur Lehman," the man offered, seeing Hayssen's puzzled expression.

Hayssen dropped the glass and sat up on the couch. There was something about Lehman. Something that was supposed to be dangerous.

But he couldn't remember what it was.

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His head began to swim and he felt Lehman's hand on his shoulder, firmly pushing him back down on the couch.

"It will take a few minutes for you to feel like yourself, Hayssen."

"What happened?" Hayssen asked inanely. His tongue felt like it was coated with glue.

Lehman smiled urbanely. "We got to you just in time, before Flaherty's bully boys could do you in. Another minute and you would have been a goner."

Hayssen digested the information slowly. Flaherty's bully boys.

It didn't seem right. He had been working for Flaherty who had hired him to do—something—about Lehman. And now Lehman had saved his life and it was Flaherty who was trying to murder him.

"I don't understand," he said slowly. "I was working for Flaherty. And now you say that Flaherty was trying to kill me. It doesn't add up."

He sat up and held his throbbing head. It was difficult to think straight about this. There were little bits of information that didn't fit, little bits of information that somehow managed to elude him when he tried to think of them.

"I know," Lehman sympathized. "It's hard to believe. But Flaherty asked you to give up the case, didn't he?"

Now that Lehman mentioned it, he vaguely remembered Flaherty calling him up and telling him to drop it.

He nodded. "Yes."

"And you refused, didn't you?" Lehman was being very logical about it.

Again he nodded.

Lehman looked patronizing. "I don't see how it fails to add, then. It makes a kind of dangerous sense for you. Flaherty had hired you to investigate me, Hayssen, and then wanted you to quit. When you refused, there was only one alternative. To kill you."

His head was clearing but it was still difficult to remember.

"Why would Flaherty kill me because I refused to give up investigating you?"

"You know a lot about the rackets, Hayssen. When Flaherty found out who I was, he obviously thought that it would be dangerous for you to find me. He probably figured that you and I would get together."

Hayssen was puzzled. It was so hard to think, so difficult to get things straight.

"I see I had better explain things further." Lehman dug some cards out of his wallet and passed them over to Hayssen.

"I'm on a citizen's committee, Hayssen, working in conjunction with the Congressional Crime Investigating Committee. As you know, Flahertys' administration is one of the most corrupt in the city's history. We've been trying to get the goods on Flaherty and his mob

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and we think we've found a way to do it."

"What about the vial?" Hayssen asked. He had almost forgotten about the vial and Lehman's connection with it. Almost forgotten—

"I was coming to that. You see, that's where I think you can be of service to us, Hayssen. Naturally you want to be of service?"

There was a thin edge of threat to that request but only a corner of Hayssen's mind caught it.

He nodded dumbly.

"The vial contains a serum that the citizen's committee has developed. Call it a compulsion serum, for lack of a better name. We've been trying to get Flaherty to take some of it. Naturally, we can't legally force him to take it against his will so we have been trying to get him to take the serum under a guise. It may not be strictly legal but then you have to fight fire with fire!"

It was strictly for the movies, a corner of Hayssen's mind thought. Strictly cloak and dagger.

But he wouldn't think of opposing Lehman's will. Lehman had saved his life.

Lehman continued. "Flaherty has discovered my connection with the citizens' committee and so my usefulness has been largely ended. But Flaherty doesn't know that you have found me—or vice versa. And that's where you can be of help."

Everything seemed so plausible when Lehman told it to him. Lehman was right, absolutely right.

Whatever Lehman asked him to do he would.

"How can I be of help?"

Lehman was all business now.

"It's still necessary for Flaherty to take the serum. You see, it's a much improved version of neo-scopolamine. Once he takes it, he'll truthfully answer all questions put to him. Now he's wise to me. But he wouldn't suspect you. *You* could get it to him."

Lehman smiled. "So he did. Maybe you could get to see him about it, agree that you have other things to do, that you are actually too busy to continue the case anyway. Anything you happen to think of. Somehow you can get him to take a drink and slip the contents of the vial into it. It's tasteless and he won't suspect.

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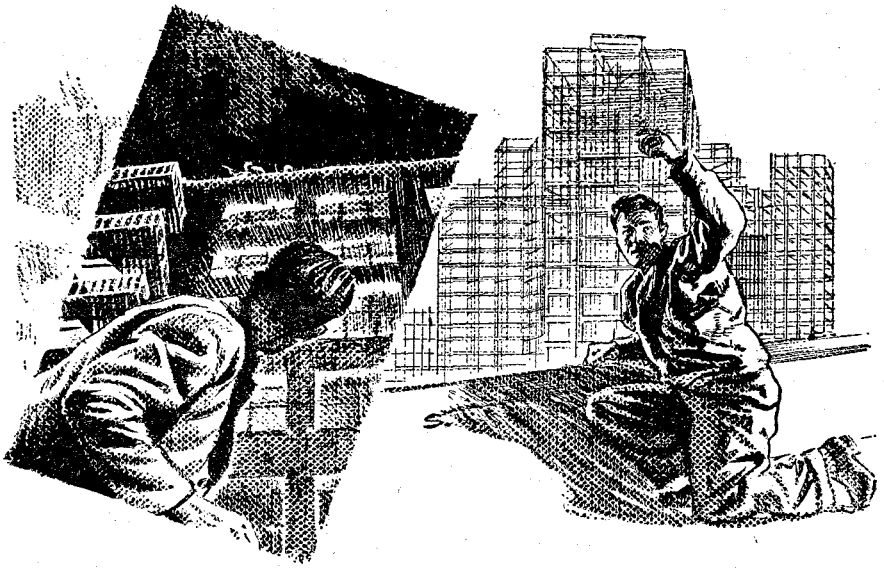

"You still have the vial you picked up at his office, don't you?"

Hayssen felt around in his pocket and finally came up with the vial of sparkling liquid.

"Good. Just put that in his drink and we'll clean up the city in nothing flat. And, of course, there'll be a tidy sum in it for you."

Hayssen was thinking hard. There was somebody connected with this, somebody who had tried to save his life some time ago. A long, long time ago.

"What about Catherine Cooper, Flaherty's secretary? She knows something about this. And yet—it's hard to believe that she'd be mixed up in something like this."

Lehman looked at him sadly, like the best friend who wouldn't tell him that he had BO.

"Flaherty wouldn't hire a secretary he couldn't trust, Hayssen. Or one who would be afraid to work in the type of business he's actually in. I'm afraid that Catherine Cooper is in as deeply as Flaherty himself."

He watched the expression flit over Hayssen's face.

"Of course, if you could find her and bring her in to me, perhaps we could get her to turn state's evidence. The sentence would be light, then."

Hayssen nodded. He felt confused and sick. Dimly, he felt that something was incredibly wrong.

But he had to trust Lehman. And Lehman had saved his life.

He picked up his hat. "I guess I better be going then. And thanks a lot." His voice trailed off. "Thanks a lot for everything."

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He wandered out into the hallway.

Behind him, Lehman closed the door and went to his desk. He opened a drawer that revealed a long panel of buttons. He pressed one and the interior of the room shimmered and disappeared. There was nothing left but a bare floor with dust on it and electric outlets with their protective caps still on.

Hayssen stood in the shadows and watched the apartment building. Cathy's room was black. But she'd be coming back sometime that night. She'd come back and then he would get her and take her to Lehman.

It was too bad she had to be mixed up with Flaherty. Too bad. But somehow he didn't feel that she knew what she was doing.

Lehman had said that she was in it as deeply as Flaherty, though.

And he had also said that she could turn state's evidence and get off with a light sentence.

He felt the sweat standing on his forehead, even though the night was cold. Something inside was fighting his reasoning, something was trying to warn him against it.

A girl was coming up the walk now. He spotted her blond hair peeking out from under a black velvet hat.

It was Cathy.

She swung into the apartment building and disappeared. A moment later the lights went on in her room.

Hayssen started across the street. A car that had been parked at the curb swung forward and blocked his way.

"O.K., Hayssen, in here," a voice said.

He started to reach for his gun.

"I wouldn't, Hayssen." The door to the car was open. He got in.

A couple of men were in the back seat and Hayssen recognized them as the newsboy and the elevator operator. He remembered a little more. How they had tried to kill him at the apartment site.

They blindfolded him and tied his arms. One of them fished Hayssen's gun out of his shoulder holster and let it drop to the floor of the car.

"You won't be needing that."

They drove for a long time and Hayssen couldn't keep track of the number of turns they made.

They finally stopped the car and helped him out. It was late at night and he guessed that there was nobody around to see them.

He stumbled up some stairs and felt himself being led down a hallway. Then he was in a wooden chair and they were taking the blindfold off his eyes.

He was in a kitchen, a modern kitchen, with all metal cabinets and a shiny modern stove. A gas stove.

The men were busy, tying what looked like strings to the windows and the kitchen door. The various threads and strings ended up in an apparatus that looked like an alarm clock. The "newsboy" set the clock for a certain time, then turned the hands until they reached it.

The clock wound up, the strings

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drew taut, and the windows opened and the door swung wide. The clock continued winding and the various strings disappeared inside it. The newsboy hastily pressed another button and the clock stopped. Hayssen had a hunch that if the button hadn't been pushed, the clock would have disappeared in a flash of flame like— Like what? He tried to think and couldn't.

The peddler came over and pressed a few nerves in Hayssen's neck. After that, Hayssen couldn't move a muscle, but just sat there, hunched over the kitchen table.

The newsboy set up the system of strings again and attached them to the clocklike apparatus. They would turn on the stove, Hayssen thought, and after a certain amount of time had elapsed—when he was dead—the clocklike apparatus would come to life and automatically open the windows and the doors, airing the room out. The police would have a difficult time figuring out how he had died.

The peddler came over to inspect Hayssen before turning on the gas. He seemed puzzled for a moment and then rolled one of Hayssen's eyelids back.

"He's been drugged!"

The others crowded around. One of them said: "Let's test it for sure."

The newsboy got a glass of water and poured it down Hayssen's throat.

His stomach reacted automatically and he threw up, the frothy liquid bubbling from his mouth like a baby drooling the breakfast gruel.

"He's been drugged all right."

One of them got a rag and wiped the table and Hayssen's front. It wasn't too good a job but then it wouldn't make any difference in another minute.

"We could bring him out of it," one of them suggested.

Another shrugged. "Why bother?"

They turned on the gas and left.

He could smell it. A sharp and yet sweet odor that drifted silently across the room.

He was almost under, the room had become a faint blur, when the door opened and Cathy Cooper came in.

She opened the windows and turned off the gas and then held Hayssen in her arms. The partial paralysis had worn off and his arms tightened around her. Then he was on his feet.

Cathy stared at him, puzzled, and then looked into his eyes.

Her face blanched.

"You've been drugged!" she breathed.

He was looking at her rather coldly.

"I'm afraid you'll have to come with me, Cathy. Lehman wants to see you."

She stared at him. "What makes you think I should see Lehman?" She had a frightened, trapped look on her face.

"Look," he pleaded. "You can turn state's evidence. That way you'll get off with a light sentence!"

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"Light sentence! State's evidence!" She started to laugh bitterly. "What a fool you turned out to be. You think it's something as insignificant as a crime probe. Why you fool, you don't even know what it's all about. You're as gullible as all the ancients. And you're supposed to be a detective!"

She was defiant.

"Besides, what makes you think I'll go to Lehman with you?"

Hayssen held a light, slim pistol in his hand.

"I got this out of your handbag a moment ago. I'm sorry but you'll have to come in." He had tried to keep his voice businesslike but he couldn't hide a thin quiver in it.

She looked at him with pity welling up in her eyes. "You've been drugged," she said quietly. "I don't think you would do this otherwise."

She picked up her fur coat and walked before him.

Hayssen had a momentary urge to throw the gun away, to comfort her and tell her it had all been a mistake.

It wasn't right, it wasn't right, it wasn't right.

And yet he couldn't think straight enough to know why it should be wrong.

The house was a handsome house in a beautiful neighborhood. Hayssen went up the walk and worked the fancy brass knocker.

The door opened and Flaherty stood framed in the opening. He looked dourly down at Hayssen.

"Aren't you even going to invite me in?" Hayssen asked.

The mayor grunted and stepped aside. Hayssen walked in and followed Flaherty into the library.

It wasn't going to be easy, Hayssen thought. He hadn't the faintest notion of what to ask Flaherty or how to trick him in to setting up some drinks.

Flaherty made himself comfortable in a huge easy-chair. He didn't invite Hayssen to sit down.

"O.K., now, what's the deal? Why couldn't you see me at my office tomorrow?"

"I wanted to tell you that I'm dropping the Lehman case as of right now."

"So? I've already ordered you to drop the Lehman case. This doesn't add anything new."

Hayssen thought frantically.

"I think I have a right to know why I was fired."

Flaherty looked annoyed. "If you want it that way, it's all right with me. I have it on good authority that for a private detective you're not a very good one. You're incompetent."

That was a logical reason for Flaherty to give, Hayssen thought. Flaherty would hardly say that it was because Lehman was after him and it was too dangerous for Hayssen and Lehman to get together.

He looked at Flaherty with contempt. An old man with cancer who ran the worst city machine in history. There was a time when he had been more tolerant but Lehman had

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soon set him right on that.

He thought of Lehman with a vague sort of uneasiness. Lehman was telling him a lot of things, quite a lot.

For the twentieth time that day he tried to pin down an elusive thought that somehow just escaped him. It was always there, just trembling on the edge of his mind, wanting to be heard. But he could never quite grasp it, never get a hold on it.

Flaherty was looking at him rather thoughtfully.

"I'm sorry I trusted you, Hayssen. You can still ruin me, you know. But I don't think you will. It would be too unhealthy."

Flaherty was fencing with him.

It might serve his purpose to fence, too.

He took a chair without being asked and made himself at home.

"I suppose I *could* ruin you, Flaherty—if I wanted to."

Flaherty took the bait. "What do you mean, if you wanted to?"

Hayssen yawned. "I'm thirsty. We might do better if we talked about it over some drinks. I've heard you have a good liquor cabinet."

Flaherty grunted and rang a bell. A moment later a servant appeared and Flaherty ordered up the drinks.

It was a nice cool drink. Hayssen sipped at it while he thought desperately of what to say next.

"I didn't know you collected antiques, Flaherty."

He was looking past Flaherty at an old cherry table that served as a coffee stand.

Flaherty glanced around and Hayssen had the vial out and over Flaherty's glass, ready to empty its contents into the liquid.

A hand came out of nowhere, holding a cube of ice between a delicate pair of tongs.

"Do you wish more ice, Mr. Hayssen?"

He palmed the vial and glanced up in dismay. A sudden shock ran through him when he recognized the butler.

It was the clerk in the grocery store who had waited on him.

Flaherty turned back to Hayssen. "As a matter of fact, I don't. My wife does. Now what did you mean when you said you could ruin me if you wanted to?"

Hayssen jerked his thumb towards the butler.

Flaherty looked grim.

"That's all right, Hayssen. Whatever you have to say, it's all right if Jonas hears it. You see, the doctors can't help him either."

Hayssen let out his breath in a slow sigh of disappointment. He couldn't do it. It was impossible now. With only Flaherty to contend with, he might have distracted him long enough to slip the contents of the vial into his drink. With the butler there too, he wouldn't be able to do it.

"I was only kidding," he said. "I didn't mean it. I didn't mean it at all."

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He left a few minutes later. He could feel Flaherty and the butler watching him through the front window.

When he got to the end of the block he turned and disappeared from their view. A moment later he cut up the alley and ended standing in the shadow of a tree several doors down and across the street from Flaherty's house.

He had a hunch that Flaherty's butler didn't live there and he was right. A half hour passed and then the front door opened and a figure left and walked rapidly down the street. Hayssen waited until the figure had a little head start and then he started after it.

He would have to catch the butler before he got to a main street.

It was dark out and a storm was blowing in from the west. The thunder drowned out Hayssen's footsteps.

He was behind the butler now. He shoved his pistol into the small of Jonas' back.

"We'll go home my way," he said softly.

The figure jerked, startled.

"You waited outside, I see. Very clever of you."

"I think so. It's about time I wised up, isn't it?"

The butler sneered. "I suppose you'll show how smart you are by taking me to Lehman?"

Hayssen wondered a little. He supposed that's what he should be doing. But he wasn't. And the fact that he wanted to find out something on his own didn't quite explain why.

"As a matter of fact, I'm not. We're going to my apartment and you're going to answer some questions directly to me."

The butler laughed. "You're rather simple, Hayssen. I don't think you're going to walk over to your apartment. And you don't have a car. That means we'll have to catch a bus or a streetcar. And once we do, what's to prevent me from simply walking away? I rather doubt that you would use your pistol in the open like that."

"What a shame," Hayssen said calmly. "You've pointed out the flaw in my plan. I suppose I'll have to kill you right here and now."

He grinned to himself at the butler's sudden rush of fear.

"But I'm not. And for that matter, we could take a cab home. But we're not going to do that either. We're going by streetcar and you're going with me. Because you'll want to."

"I don't see how—"

Hayssen took a common pin out of his pocket and held it behind the butler's ear, then jabbed sharply down with it. It drew a drop of blood and a startled cry from his captive.

"That's rather simple, too. You've probably read all about it. The slow acting poison that only the hero has the antidote for. In this case, it's at my apartment."

"You have a good imagination, Hayssen. I don't believe you."

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Hayssen laughed. "O.K. then, don't. Go ahead. Walk away. I'm merely shooting off my mouth to make conversation."

The butler hesitated and then reluctantly gave in.

"And by the way, Jonas. We'll go up the back way. I wouldn't want any of your friends to run into us."

They made themselves comfortable in Hayssen's living room. The butler was sweating, small beads of sweat that crept into the corners of his eyes and made them water.

Hayssen mixed himself a tall one from the radio-cabinet liquor cache.

The butler finally broke the silence.

"You mentioned an antidote, I believe. I suppose it would be asking too much—"

Hayssen looked up, amused.

"It would. You see, there isn't any. My imagination only got as far as thinking of the poison."

The butler sprang to his feet.

Hayssen waved a pistol at him.

"This isn't as neat as the guns you use. It makes a nice, messy hole." The butler sat down. "And don't feel too bad about falling for a story like that. You couldn't afford to take the chance that it wasn't the truth."

He toyed with his drink. "I suppose I should be very British and offer you some but to be frank, I don't have enough whisky left." His voice became harsh. "Jonas is just too domestic a name, chum. What do you call yourself?"

"Smith is good enough."

"O.K., Smith. Now suppose you tell me just how you fit in the deal with Flaherty."

Smith leaned forward eagerly.

"Look, Hayssen, I can't tell you the truth. I would like to, but I honestly can't. But it isn't what you think. It's not a simple matter like a crooked city machine or anything like that. A world is in the balance, Hayssen!"

There had been somebody else, a long time ago, who had said something like that. Somebody who had wanted to tell him what it was all about but claimed they couldn't.

If only he could remember!

Smith was talking again. "I don't know what Lehman has told you, Hayssen, but I could puncture his logic for you if you were only normal. But you wouldn't believe me, now. You've been drugged, Hayssen, drugged!"

Hayssen considered it thoughtfully.

"Could you prove it?"

"Certainly. Tell me, have you drunk any water in the last day or so? I thought not. Try it now. You'll be sick, horribly sick, but it'll clear the drug out of your system."

He could try it. Drinking water wouldn't hurt any. And there was always the chance, the bare chance, that Smith was right.

It was odd, he thought. A day ago he would never have doubted Lehman. But now it seemed possible, just possible— His faith in Lehman

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had gradually been wearing off. Like a drug?

"O.K., I'll try it. But you go first."

Smith shrugged and preceded Hayssen to the kitchen. He ran the tap until the water was cold, then took a glass, filled it, and drank it. Hayssen watched him closely. There was no reaction at all, unless it was satisfaction at quenching one's thirst.

Hayssen held a glass under the tap, still keeping his gun trained on Smith.

The water tasted nice and cool and it came to him with something of a shock how dehydrated he actually felt. Not exactly thirsty, but just *dry*.

The reaction was swift.

He gagged and then vomitted. He managed to watch Smith through watering eyes and keep the gun trained on him but it took effort. Enormous effort. He retched some more and had the hideous feeling of the dry heaves coming on.

He was empty now, thoroughly empty inside. And he felt very weak. It was hard to think at all. Smith had been partially correct at any rate, or else it was an elaborately planned trick.

The phone rang.

Smith turned and walked in front of him back to the living room. Hayssen picked up the phone.

The voice at the other end of the line was frantic.

It was the chemist with whom he had left a small portion of the contents of Flaherty's vial.

"Hayssen? This is Jim Paul. I've been trying to get hold of you for hours. Tell me, do you have any more of that liquid you left here?"

Hayssen could feel the excitement in his voice.

"Why?"

"I injected one cc of the fluid into a cancerous guinea pig on the verge of death. The pig didn't die, Hayssen, it didn't die. It was a complete recovery! Not only that but the pig looks healthy enough to live to a hundred!"

Hayssen felt sweat soaking into his undershirt.

"I'll call you back."

He put down the receiver and stared at Smith. Smith had heard the conversation and had an I-told-you-so expression on his face.

"O.K., Smith, I'm convinced I was drugged and that Lehman isn't what he said he was. What's the whole story?"

Smith was stubbborn. "I'd like to tell you, Hayssen. I mean that sincerely. But I can't."

Hayssen could remember things now, things that still didn't fit. He walked over to Smith.

Smith was smiling. "I suppose you'll let me go now?"

Hayssen shook his head. "Whatever else Lehman is, he saved me from being killed by you and the others. I suppose I'll have to see Lehman personally and find out what's going on for myself."

"You going to tie me up then?"

Hayssen remembered the pitiful

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bundle that had been Jock.

"I don't think that will be necessary." Before Smith could move, he brought up the pistol and slugged him on the side of the head.

He watched Smith crumple to the floor and then got his hat and coat. He would have to hurry.

He hadn't forgotten that Cathy Cooper was with Lehman. And that, for some reason, Lehman was a sworn enemy of hers.

A light was on in Lehman's office.

Hayssen ran lightly up the stairs and then stood outside the door for a moment before opening it.

He could hear Lehman and Catherine Cooper talking together on the inside. Cathy's voice was firm and controlled, though a quiver of fear ran through it.

Lehman's was threatening, brutal.

He listened and felt himself grow cold inside. They were speaking English, but a twisted, corrupted English that bore very little resemblance to what he spoke. And there was something he hadn't noticed before. Lehman was talking with the same peculiar accent that Cathy used.

He turned the knob and walked in.

Lehman looked up with a surprise

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that quickly turned to annoyance.

"What do you want, Hayssen?"

"I'd like to ask you some questions, Lehman."

Lehman assumed an air of tired patience.

"I'm questioning Miss Cooper right now, Hayssen. Why don't you wait until morning?"

"Why don't you question Miss Cooper in the morning?" Hayssen's voice was tight. "And what were you questioning her about?"

"Just asking her co-operation." Lehman's voice was smooth and untroubled. He turned to Cathy Cooper. "Wasn't I, Miss Cooper?"

Cathy looked up for the first time since Hayssen had come into the room and nodded wearily.

"Anything else you want to know, Hayssen? If not, I'd suggest you get back to following out your orders in regards to Flaherty."

"I think," Hayssen said slowly, "that I would like the answer to some questions first."

Lehman settled back in his chair. "O.K., shoot."

"First of all, I would like to know, if Flaherty was out to get me *after* I refused to drop your case, who was it that tried to kill me before? Who was it that tried to kill me the same night after I first saw Flaherty?"

"You're mistaken," Lehman said flatly. "It never happened, Hayssen."

It was becoming rather obvious, Hayssen thought.

"Look, Lehman, I drank some water recently and I got pretty sick. I think that I was drugged."

There was hidden fear in Lehman's eyes.

"I suppose you think that I tried to kill you. You're wrong, Hayssen, absolutely wrong. In fact, if you still doubt me, we'll leave it to an impartial judge."

He turned to Cathy Cooper, who had looked up with new hope in her eyes when Hayssen mentioned that he had been drugged.

"Tell him the truth," Lehman encouraged. "Did I ever try to kill Mr. Hayssen?" There was laughter in his eyes.

Cathy shook her head. "No, but—"

"And isn't it true that I rescued him from those who *were* trying to kill him?"

"Yes," desperately, "but that isn't the whole story!"

"It's enough, Miss Cooper."

"Wait a minute," Hayssen said. "Suppose we let Cathy tell us the whole story."

Cathy looked like she was ready to cry. "I can't, Don. I can't!"

Lehman shrugged.

"You see, Hayssen? She refuses to co-operate. As a thoroughly guilty person would."

Hayssen felt his resolve begin to waver. It looked like Lehman was right, that Cathy was involved in some criminal scheme. He swore silently. You're some guy, Hayssen, he thought. A pretty face and figure come along and somebody could use your brains for pillow stuffing.

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He looked at Cathy and saw something he hadn't noticed when he first came in. There were faint discolorations around her cheekbones and jaw. He had a pretty good hunch of just what and who had caused them.

He looked at Lehman and knew he hated him.

"I've got one more question," he said quietly.

Lehman looked calmer now but there was still a guarded look in his eyes.

"All right, Hayssen, ask it. I have nothing to fear."

I hate smooth guys, Hayssen thought. Particularly smooth guys who turn out to be right when I don't want them to be right.

He took a breath. In a way it was a silly question, a fantastic one. But it would be still more fantastic to look for a logical explanation. If you had a certain line of reasoning you followed it to the bitter end, no matter how silly it seemed. And coiling wires, slim, modernistic pistols, people who seemed able to disappear at will, and even the peculiar accents made a twisted sort of sense.

"When are you from?"

There was a gasp from Cathy and a shocked look on Lehman's face and he knew he had struck oil. Lehman's hand darted for a desk drawer.

Hayssen leaped for the desk and brought his fist down on the hand. Lehman shrieked with pain and twisted away. Hayssen grabbed him by the shoulder and then Lehman doubled up and kneed him.

They broke and rolled out on the carpet. He hammered at Lehman's face, trying to break Lehman's grip around his throat. The room started to blacken and then he had Lehman by the collar and they were on their feet. His fist shot into Lehman's face. He could feel the splinter of teeth against his knuckles.

Lehman's head jerked back and he hit the floor and lay still.

Hayssen turned to Cathy and swept her into his arms.

She was nice and soft, he thought, and her hair smelled good. He brushed her lips with his and they clung close together. There were a lot of things that weren't explained but they could definitely wait.

After a moment Cathy sighed and wriggled comfortably out of his grasp.

She looked over his shoulder and her eyes went wide.

He turned in one movement and dove for the desk. Lehman sat behind it, fiddling with some knobs on what looked like a control board.

He found the right dial and turned a bloody, triumphant face to Hayssen.

Hayssen hit the desk and kept right on going through it, beyond it, to end lying on a floor that lay six inches beneath a ghostly carpet.

Lehman and his desk and office equipment, rugs, wall-hangings, and chairs were like a room within a room. They shimmered and twinkled in a ghostly phosphorescence and slowly faded from sight.

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Hayssen picked himself off a dusty floor and stared around the room, bewildered.

It was absolutely empty except for he and Cathy.

"I think you had better explain some things, Cathy. It would help me a lot."

She didn't look up. "We're not supposed to," she said in a small voice.

"Look," he burst out, "people have tried to murder me about five times in the last week. Somebody kicked my dog around and it wasn't funny. I've checked up on people who seem to appear and disappear whenever they want. And now Lehman does a by-by act right while I'm in the room!"

He lowered his voice to a lecture tone. "I know some of it. I know a lot of it. I tested the vial that Flaherty bought. It was the real McCoy. Everything that Lehman had told Flaherty about it was true. For all I know, Cathy, maybe Lehman was on the right side."

She looked up at him. "You know about the vial then?"

"Yes."

"It's against the Prime Injunction," she said slowly. "We're not supposed to tell. We'd be breaking the rules."

"What rules?" he prodded gently.

She managed to find the nerve to say it.

"Against the rules of time travel."

He caught his breath. He had been right then. A wild, fantastic guess and he had hit the nail on the head.

"You're a time traveler from the future?"

"Yes," she said proudly. "I'm from the future."

He took his arm away. She wasn't just a frightened girl. She was something else. Something magnificent.

"Tell me about it," he asked simply.

"Your century, Donald, has been visited many times by our people. I suppose that you could call me and the others history students. We go throughout all history and take small jobs and study the different civilizations. When I came back to your time I decided to become a secretary to one of your politicians. I was going to write a thesis on the Twentieth Century."

She had said that she had been named after a famous actress, Hayssen thought. But he had never heard of the name. Naturally not. She had been named after a famous actress in *her* time, an actress who would not be born yet for thousands of years!

"I suppose we're actually more than just students," Cathy continued. "Call us watchmen in the museum of time who see that none of the exhibits are damaged or stolen. We're watch-wardens for the past, custodians of history to see that nobody comes back in time and tries to change it."

"That's where Lehman fits in,

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isn't it?" he asked hesitantly.

She nodded. "Lehman is a member of what you would call a political party, but not a legally recognized one. By traveling into the past he sought to change it enough so that his party would be in power in the far future."

"He hoped to work it through Flaherty some way, didn't he?"

"Yes. If Flaherty lived long enough he would back a certain candidate for senator. This person in turn would become president. A very poor president, Donald. A tyrant. And the past would be altered sufficiently so that Lehman would be our ruler in the future."

"At least Flaherty would get a fair shake out of it." He felt sorry for Flaherty who had had the cure for his cancer right in his own grasp.

She shook her head. "Even Flaherty would not have benefited from it. You see, the vial of liquid would make a person live a thousand years, our own life span. But Flaherty would have lived just long enough to be useful. Then Lehman would have seen that he met with an accident."

Hayssen whistled. "I'm beginning to see. But Flaherty was warned against taking the vial."

She laughed. "I called him up and told him that it was poison. We covered Flaherty pretty thoroughly to make sure that Lehman couldn't get to him. We even had a man stationed in Flaherty's home as a butler."

Hayssen thought of Smith, who was probably still out cold in his apartment.

The next question was a tough one. He could feel Cathy tense, expecting it.

"If neither Flaherty or Lehman were trying to kill me, who was?"

The answer came as a shock, even though he half expected it.

"We were."

"I . . . I don't understand."

She turned toward him, pleading.

"It's one of the rules of time travel, Donald! We can't let anybody in the past know that they are being visited by people from the future. We can't allow the past to be changed, as it would be if people knew we were visiting them. If you change the past, you change the future. You alter the fabric of time!

"But there's more to it than that. Do you think that people in the past would be content if they knew that there was a means of escape to a future that naturally offered a much better life than the age they were living in? Do you think that people would have incentive and ambition, knowing that everything that could be already was? That every machine and invention had already been invented? They would search us out, Donald, and we would no longer be able to travel back in time. And if they got hold of the chrono-machines, the future would be faced with a wave of immigration from the past!"

"I see," he said slowly. "And I

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was dangerous to you."

She sighed and her head drooped. "Yes. You were a private detective, assigned to investigate Lehman. An ordinary person looking into Lehman's past would have been dangerous. A private detective was much worse. And a private detective in possession of Flaherty's vial of liquid was too dangerous to live. We thought that we could handle Lehman ourselves. But you were an unknown factor. You had to be eliminated."

It all fit, he had to admit that. The newsboy and the clerk and the cop on the beat. All "history students" like Cathy was. When word went out that he was investigating Lehman, they had tried to kill him.

And they had succeeded in killing Jock.

Cathy read his face.

"I'm sorry about Jock," she said, "But if you still want him, we can get him. I don't think it would alter the future much if one small dog lives instead of dying.

His face was blank. "But you can't bring objects back from the dead!"

She laughed at him.

"It's very simple, Donald. Picture time as a highway with small roads that branch off, wander a little, and then come back to the main road. That's what we can do. Travel back to just before Jock jumped on the mesh-net—the bedspread—and take him with us."

Hayssen felt dizzy.

"Besides, Donald, how do you think that Lehman rescued you once the brick wall had toppled on you? He picked you up just before that.

"You don't remember the wall, do you? Of course not. For you, it actually never happened. It's a small part of the past that was changed. I know. You are about to say that it is a paradox. But that is only because you are foolish enough to believe that the future is dependent on a lot of little things. It isn't. History is a tremendous canvas, Donald, and one or two very small brush strokes, if changed, would hardly alter the whole picture."

"I shouldn't complain," he said. "After all, you saved my life."

She blushed. "You were right when you accused me of eavesdropping. When I listened in on your talk with Flaherty that day, I reported to the others that you were after Lehman and were dangerous. We took a vote and the majority decided on eliminating you. I disagreed. I thought that perhaps you could be persuaded to drop the case."

They do it for science, Hayssen thought, or they do it for friendship or they do it because of a maternal instinct. But they'll never admit that they do it for love.

"You're sure there wasn't any personal reason?"

She was suddenly very furious, recalling his kiss when he had rescued her from Lehman.

"You are very foolish, Donald! I could never love a man thousands of years in the past. Besides, that is ex-

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pressly forbidden by the rules!"

He had her in his arms. She struggled for a moment and then abruptly relaxed.

"I love your cute futuristic accent," he said softly.

"Is that all you love about me?" she murmured plaintively.

He kissed her mouth and she shut up.

"You're more of a sociology student than a straight history student, aren't you, Cathy?"

She smiled. "You're right. How did you guess?"

"My business as a detective, darling. You knew what ink-sticks and flukum were when I mentioned them to you. It isn't the sort of knowledge that any secretary would have."

"I knew I had made a slip there. Like saying I had been named after a famous actress. You caught that one too, didn't you?"

"I did, but it never made sense. And there's something else that's puzzling me. You called me at my apartment that one time to warn me. Why didn't you call when your friends were waiting to kidnap me, the day I came home from work?"

"I did. Only you had gone home by then."

It was nice to know she had been on his side all the way through, Hayssen thought.

"Well, what'll we do about Lehman now?"

Cathy looked up.

"What do you mean 'we'?"

He grinned. "The only safe place for me to be is with you, every minute. And I imagine you have plans about Lehman."

She frowned. "Well, I guess I'll make my report on him and then wait for further instructions."

"We could keep after him," he said slowly. "You and I. I still have a few scores to settle with him anyway."

His neck still ached where Lehman's powerful fingers had dug deep. And there was the slight matter of some bruises on Cathy. Lehman had done his best to get Cathy to co-operate, to betray her future.

"I was wondering, Cathy — is there any other age that Lehman could go to, where he could change things like he can here?"

"I don't think so. Our bureau of research concluded that it would be easiest to change the fabric of time in the Twentieth Century."

"Then he must still be around, still trying to get at Flaherty."

She looked worried. "We have Flaherty pretty well covered but there's always a chance—"

"Then we'll have to find Lehman as soon as possible. I kind of wonder, though, if he would take off—go farther back in time—if we got too close to him."

"We could follow in my own chrono-machine," Cathy suggested. "But we'd have to get after him quickly."

Hayssen suddenly thought of something. "Your apartment is a

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time-machine like Lehman's office was, isn't it?"

She nodded. "Why do you ask?"

"How big is it?"

"Fourteen by sixteen feet. You see, we have to live in them. You can't park a time machine in an empty lot or leave it in a warehouse. So we live in them and have offices in them when we travel." She laughed softly. "Sometimes we have trouble finding places where they fit. Once I had to rent a dungeon in Elizabethan England to hold mine!"

"You have your own power supply, don't you?"

She nodded.

That explained the lack of use of the electric outlets, he thought.

He told her about Martin Green and how Green had been in his room one moment and gone the next.

"The man you call Green is one of Lehman's confederates, Donald."

The clerk in the license bureau probably was too, he thought. He could have notified Green that he was about to be visited and Green would naturally have been home when he called. Green had probably rented the room to lend a note of authenticity to Lehman's references in case someone should look them up.

It wouldn't have been at all difficult for Green to hop in a time machine and be in his apartment when Hayssen had called. The chrono-machines were maneuverable in space, as well as time.

He kissed Cathy again. "Come on, we've got work to do."

It was easier than he thought. Lehman was too anxious, too ready to try again. He found him through the papers. It was a business personal ad, just a small ad for a health salon. But the wording was such that it would catch the eye of an old duffer like Flaherty. It had good advertising appeal, hinting that you could be healthier and live longer if you came to the salon. And there was a catch line about cancer buried in the ad.

It could be just another quack, he thought. But it was too pat, too smoothly professional, for it to be anybody else but Lehman.

When he got to the address he was just a second too late. There was the same ghostly phosphorescence, the same shimmering outlines of Lehman, sneering openly at him.

He took a tiny "printed" transceiver from a brief case and gave Cathy the news.

"Go down to the street and wait for me, Donald. I'll be there in exactly thirty seconds!" Her voice was warm and confident.

He ran down the stairs and out into the street.

Lehman's new office had been in a building at the corner of Lawrence and Broadway. The streets were full of mid-afternoon shoppers and honking automobiles. A traffic cop stood at the intersection and guided the streams of traffic. He probably tried to close a bookie, Hayssen thought briefly, and got sent to this corner as punishment.

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He searched the air above the street closely. A few of the shoppers noted his concentration, stared at the open air, and then went on their way, nodding wisely to one another and pointing suggestively at him.

Suddenly there was a glimmering and then the shadowy outlines of the time machine came into view.

Traffic screeched to a halt and pedestrians were frozen in their tracks. There, ten feet above the street, was a full-sized room with transparent walls, hanging unsupported in midair!

Cathy slid the door open and lowered the machine until it just grazed the tops of the automobiles in the street.

Hayssen vaulted through the crowds and grasped the bottom of the open doorway. He pulled himself aboard and Cathy started the machine and they slowly disappeared from view.

He couldn't help grinning to himself. Several thousands of people had seen what had happened but it would be a miracle if there were ten who would agree on what they had seen.

The papers would run riot, he thought, but then some savant from the University would probably save the day by swearing that it was a mass hallucination and there were hundreds like it on record.

Cathy was busy at the instrument board and since there was nothing he could do to help, Hayssen bent his attention to the view through the transparent walls.

Below him, in the street he had just come from, he could see the traffic slowly moving backwards and people disappearing into stores. The whole colorful kaleidoscope was slowly winding up. In a minute or so all the traffic had disappeared and the light was dimming.

It was near morning, he thought, before the people started going to work.

Far in the distance, through one of the side walls, he spotted a little cube of red.

Cathy looked up from the instrumental panel at his question.

"That's Lehman's chrono-machine, Don. We'll have to follow him until he stops. There's nothing we can do until then."

He turned back to watch the city. The endless passage of days and nights had resolved itself into a featureless light gray that seemed to blanket the city. It was like seeing it through a very light fog. Some of the newer buildings were missing and a few older ones had taken their place.

He caught a fleeting glimpse of a human figure dressed in the style of the late Twenties and then they were going too fast to see people. Forests and brush had grown up and engulfed a good section of the city.

They were over the downtown area, now, about a mile from Lehman's machine. The Chicago Loop was vaguely outlined but the El structure had disappeared and so

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had the Board of Trade building and the Tribune Tower and other famous landmarks. In another heartbeat Chicago was nothing but a collection of wooden houses and mud streets. Then a stockade, nestling where the Chicago River and Lake Michigan joined together.

Lehman's machine slowly swung over the continent toward the East and Hayssen and Cathy followed. Chicago had disappeared entirely. Only prairie land and forests stood by the southern tip of Lake Michigan. They were near the east coast before they hit cities again.

They hung over New York for half an hour or so and watched that fabulous port dwindle down to a tiny village of log huts and then disappear entirely into a stretch of virgin timber. A minute later a few small boats hastily put out from the Massachusetts coast and sped rapidly backwards to Europe.

They had followed Lehman over to England when Hayssen thought of something.

"Cathy, I kind of wonder why Flaherty took me off the case. That was something I hadn't expected. I still can't see why the old duffer did it."

She smiled and an impish light shone in her eyes.

"All I did was tell him that I had looked you up and found that you were perfectly unreliable and that the best thing he could do was discharge you on the spot!"

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He laughed and looked at the view outside the machine again. Cathy was standing at his side and his arm crept around her waist.

They were fleeing backwards in time, he thought, past the uncounted ages. They watched the fall of Rome and saw the glory that was Greece. They saw the pyramids gradually torn down, block by block slowly taken away and replaced in the enormous quarries. And Cathy told him how she had once been a priestess in a temple of Ra.

Civilization had receded now from the vast plains and forests of Europe. A small colony of thatched huts held sway for a moment along the banks of the Nile and then they, too, were gone. What human life there was existed in small isolated groups that lived in caves. Gradually these groups drifted back to the shelter and the comfort of the trees.

It was weird, Hayssen thought. From proud, upright man to brutish, beetle-browed creatures who caught and ate small animals raw because they hadn't yet discovered the magic of fire.

Several hours after they had started, a call came for Cathy on the small radio that allowed communication between the students in the various eras.

She answered it and turned to Hayssen with a sober look on her face.

"We have eliminated Martin Green."

Hayssen tore himself away from the view through the transparent walls.

"How?"

"Green stopped his chrono-machine in Spain during the Inquisition. One of the students there managed to wreck his machine and block his escape. Then, in the guise of a monk, he accused Green of heresy."

He could see Green, fat and sweating, before the Inquisitors. He probably hadn't been able to answer their questions satisfactorily so naturally he would be tortured to give the right answers. And poor Green probably hadn't known them.

He tried to keep his attention on the scenery.

They had followed Lehman all over the globe now, a trip that was a fascinating tour of the ages.

Land bridges appeared between England and Europe and Asia and America. Then the continents themselves subtly altered shape and changed and flowed in an almost fluid fashion.

He saw great sheets of ice creep down from the poles and cover huge sections of America and Eurasia, and then crawl back even faster.

The time machine was gaining speed, rocketing through the years.

Huge forests of the carboniferous era sprang up and died overnight. They slowed down once over a continent that looked like a badly distorted map of Africa and Hayssen saw huge saurians wallowing in the swamps and lumbering over the lush plains.

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Then the dinosaurs themselves dwindled and disappeared and the only life was the teeming forests of ferns and the little things that wriggled and dove in stagnant pools of water.

The machine was slowing down and Cathy maneuvered it closer to the reddish cube that was Lehman's.

The land was a nightmare now. Fields of rubble and tumbled stone and volcanic ash. The light was tinged a lurid red and active volcanoes belched huge columns of acrid smoke and flames high into the air.

The machine stopped.

Lehman's machine was about a city block from theirs. The door to it swung open and Lehman appeared, haggard and worn. He hesitated a moment and then he was outside, running on the soft, hot ash.

"Open the door, Cathy."

Her face was frightened.

"You don't need to, Don! We—"

"Open it, Cathy!"

She bit her lip and punched the button on the control board. The door slowly swung open.

It was like standing at the open door to a furnace. Waves of heat beat in at him and the air was hot and smelled of sulphur.

He stood there for a moment and then plunged outside after Lehman.

The acrid air cut into his lungs and brought tears to his eyes. Lehman was a dim figure in the distance, half obscured by wisps of smoke.

He could feel the heat from the hot ash seep through his soles and start to burn his feet. He wouldn't be able to stand it long. He'd have to catch up with Lehman in a hurry.

He caught Lehman on a rocky mound past which flowed a small stream of molten lava. Lehman had turned and was facing him, hate and determination on his face.

"You made a mistake, Hayssen," he shouted. "You came out unarmed!"

Lehman had a flame pistol in his hand and Hayssen promptly dropped to the ground. A beam of purple light flared through the air, cutting through the spot where he had been.

He couldn't stay there forever, he realized. The hot ground was burning his chest and the steamy, sulphurous vapors were eating at his nostrils.

He was on his feet, ducking and twisting toward Lehman. Lehman's eyes were red and watering and he had difficulty aiming at Hayssen.

Then Hayssen was on him, grabbing and twisting his arm. Lehman's fingers relaxed and the pistol fell into the lava stream.

They were fighting silently now, atop a cindery hill a billion years back in time. Lehman fought tenaciously and well, rolling with Hayssen's punches and slowly edging him toward the side of the mound. Thirty feet down, small flames leaped and ran over the lava.

They were practically naked, clothing that was wet with sweat

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long since having been burned off and torn. Hayssen could feel the soles of his feet blistering. His lungs choked and burned for oxygen.

He got Lehman by the throat and started to rain blows on his head. They twisted and rolled and then Lehman was up, half crazed with pain, backing off, scrambling back like a crab, one hand feeling along the ground for a loose rock.

Lehman was at the brink and suddenly his hand felt nothing beneath it. He screamed and scrabbled for a grip.

His last scream died in a wailing gurgle.

Hayssen crawled to the edge and peered down. Something lay charred on the surface of the lava flow, something that flared for a minute with a bright harsh flame and then was nothing but flaky cinders.

He felt sick and turned to go back to the time machine.

There was no way back! The way was choked by fiery fingers of molten rock. And the hill he stood on was gradually being submerged by the flow.

He coughed and staggered back to the summit. There was nothing to do but wait for death.

A moment later he felt something settle nearby. It was Cathy and the time machine. He half fell and was half pulled through the open doorway. Then he felt cool hands caress his face and start to strip from his feet the twisted and burned pieces of leather that had once been his shoes.

Hayssen woke with a slow feeling of wonder. His blistered feet and seared lungs no longer pained him. He was dressed in clean, cool clothing and was lying on a couch in what seemed like an anteroom.

Cathy was smiling at him.

"You didn't expect to recover like this, did you?"

She sat on the couch and stroked his forehead. "Really, Don, don't you think that medical techniques have improved some since your time? Blistered feet and twisted ankles are as minor as a cold now."

He thought of the time when he had tripped over the I-beam at the apartment site and twisted his ankle. That had been a clue he had overlooked.

I wonder what the A.M.A. would think, he thought.

"What happens now?" he asked.

"We are to await judgment before the Council." Her smile was somewhat sad.

Hayssen was on his feet. "What for?"

"We – changed things slightly, Don. When I picked you up off the streets of Chicago that time. If it hadn't been for the distraction of the chrono-machine, a certain girl going shopping that day would have met and fallen in love with a young man who worked in one of the stores.

"It's one of those things that hardly ever happen, Don, but it did and the future was changed. Their descendants disappeared from history. It wasn't a large line or a strong one but there are several

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slight differences now. One of the students who was studying your time has disappeared, so has a member of the Council."

He felt his heart sink. This council of hers wouldn't be lenient, he thought.

She opened a door and he got up to follow her through it. He felt something rub his legs and he looked down.

Jock was looking up at him, patiently waiting for him to give some sign of recognition.

Cathy must have picked him up like she had said she could.

He knelt down and scratched the dog's ears. "We're in a fix, Jock. Maybe she shouldn't have picked you up—"

He turned and followed Cathy into the council room. Jock padded silently after them.

The Council chamber was a huge, vault-shaped room the top arch of which was hundreds of feet above his head. The floor was a solid surface that looked like blue tinted marble and stretched for yards without a sign of a crack. They were the only ones in the room with the exception of eleven men sitting on a low dais at the exact center.

Once there had been twelve councilors, Hayssen thought.

There were no visible guards but Hayssen could conceive of nobody trying to break away or commit a violence. It would be like a murder inside a cathedral.

The dais seemed at least a full city block away. Their footsteps echoed from the marble floor and re-echoed from the polished brilliance of the glassy walls. There were no corners to the room and he realized it was like being inside a shell casing, magnified a million times, where the floor is perfectly round and the walls rise to a cone overhead.

They were in front of th Council now. He stood ill at ease and watched Cathy bend her head slightly as a token of respect. He followed her lead and then stood there awkwardly awaiting what might happen next.

The old man who sat in the middle, apparently the head of the Council, looked at them quietly for a few minutes. Hayssen had a feeling that he was being inspected and weighed and found wanting.

"The case of Cathrinxa Cooper and one Donald Hayssen, an ancient from the Twentieth Century," the old man droned. "The woman Cooper is charged with violating the Prime Injunction and revealing the existence of time travel to said Hayssen. Her motives apparently were confusing at the time but it is thought that personal desires entered into it. Recommended that she be confined, stripped of her status as watch-warden and student, and be prohibited from ever entering the time lanes again."

He paused a moment. A murmur of assent rose from the other members of the Council. Catherine Cooper said nothing but stood there

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with bowed head. Hayssen moved closer to her and let his hand find her own.

The oldster started up again.

"As to Donald Hayssen, inadvertently drawn into an affair not dealing with his time and age, it is recommended that he be deprived of his memories of the event and sent back to his own time, to live his life as he will."

Again the murmur of assent.

The Council started to file off the dais. At the same time Hayssen finally found his voice. It was a cracked and trembling voice but he managed to keep it fairly well under control.

He was nervous but that couldn't be helped. A Neanderthal brought before a group of Chicago aldermen would feel exactly like I do, Hayssen thought.

"I object!"

The Council looked interested. It had been a long, long time since anybody had objected to their decisions.

"I object," he repeated. "I think you owe me something!"

The oldster pursed his lips. "Why do you think we owe you something?"

Hayssen tried to be as persuasive as possible.

"It's true that the students might have been able to take care of Lehman by themselves. But the fact is, they didn't. Lehman might easily have changed the past, and far more radically than Cathy and I did. Perhaps to the extent that your civilization as you know it — maybe even yourselves — would cease to exist!

"Cathy and I were the ones who followed Lehman." His voice dropped. "We were the ones who killed Lehman. And we were the ones who saved you."

The Council sat there quietly.

"I think you owe us something," Hayssen repeated stubbornly.

"All right, Hayssen," the oldster said finally. "What is it you want?"

"Cathy."

The Council was in an uproar. Cathy moved next to him and he put his arm around her protectingly.

"If we grant the woman Cooper to be reprieved and allowed to live with you as your wife," the oldster began, "has it occurred to you that she will live for a thousand years while your own life span is at most a hundred?"

"I've thought of that," Hayssen said humbly, "and I've thought of a solution."

He reached into his pants pocket and drew forth the vial of sparkling fluid. He had saved it and protected it for the last three weeks and he thanked the gods who had given him brains enough to leave it in the time machine when he had gone out after Lehman.

He drew the cork and drained the contents, then let the vial drop and shatter on the floor.

"That was the last of Lehman's vials," he announced. "And there is no reason now why Cathy and I can't be together."

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The Council sat in silence. They seemed unable to come to a decision.

"If I may," Hayssen pleaded, "I think I can suggest a solution."

They looked at him coldly.

"One of your Council members is missing and so is one of the students who was studying my era. Why can't Catherine and I return to my time and continue there as she has been, studying the past and acting as watch-warden so people like Lehman can't alter the past? What have you to lose?"

There was a sober discussion and then the head of the Council turned back to Hayssen. He had a hint of a smile on his face.

"So be it!"

They were in the time machine again, watching the ages roll past. Cathy stood next to him, her head resting lightly against his shoulder.

It was going to be a wonderful future, he thought. They would see the marvels of tomorrow, watch the race develop spaceships and grasp the moon and the planets and then reach out for the distant stars. They would watch the world come out of the dark ages and gradually become a better place in which to live.

But there would be heartbreak and pain, too. They would outlive their own children ten times over. They would see wars and poverty and famine past anything they had ever known.

And they would have to disappear every twenty years or so. If they didn't, their friends and neighbors would get to wondering why he and Cathy were always so young, so youthful.

It wouldn't be easy to see his children die and have to find a new living and make new friends every twenty years or so. But it would be worth it.

He would have a ringside seat at the drama of the ages, the ebb and flow of the tides of history.

He looked out of the transparent walls of the machine. The familiar towers and buildings of Chicago were slowly coming to view.

He bent down and kissed Catherine.

"I love you, Cathy," he murmured softly.

It would be a wonderful future, he thought again. And the best part of it was, Catherine would always be with him.

For a thousand years—

THE END

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NO GREEN CHEESE

BY DANIEL WHITTON

The pilot of the first rocket to the Moon will have to be most choosy of his landing place, or else he may find himself buried beneath several miles of nearly-molecular dust! The so-called "maria" or "seas" which the early astronomers thought were oceans of water instead may be great oceans of dust particles, according to a hypothesis propounded by F. Hoyle and T. Gold, at a recent discussion of "Planetary Atmospheres" by the Royal Astronomical Society of England.

It is generally agreed by astronomers today that the lunar craters were caused by the impacts of many tens of thousands of meteors at an early stage in the Moon's development. If this is so, we should expect that the lunar craters would be distributed nearly at random over the Moon's surface. Actually, the great plains or "seas" which show as dark blotches, even to the naked eye, are nearly devoid of craters. It is Gold's theory that these sections of the Moon were originally low regions on the Moon's surface which have gradually filled up with dust particles of a diameter estimated as being about one hundred angstroms, a fraction of a wave-length of light. Particles this finely divided are so small that they only contain about a million atoms each and would be just about conveniently visible in an electron microscope. The origin of dust such as this would be the great changes in temperature of the surface rocks, when after two weeks cooling into outer space, the sunrise comes blasting across the airless sky with an actinic intensity of all wave-lengths, unknown on the face of the Earth.

Since there are no winds to carry these particles along, some other explanation was sought for the way in which they could collect at the lowest spots. It has been ingeniously proposed that the very sunlight that makes the dust may also be the origin of the necessary repulsive or levitational forces; intense short wave-length ultra-violet radiation would knock out photoelectrons from both the dust and the Moon's surface, leaving them mutually positively charged, and mutually electrostatically repulsive. Thus friction would lose its grip on the particle, and gravitation could drag it down to the lowest points of the surface.

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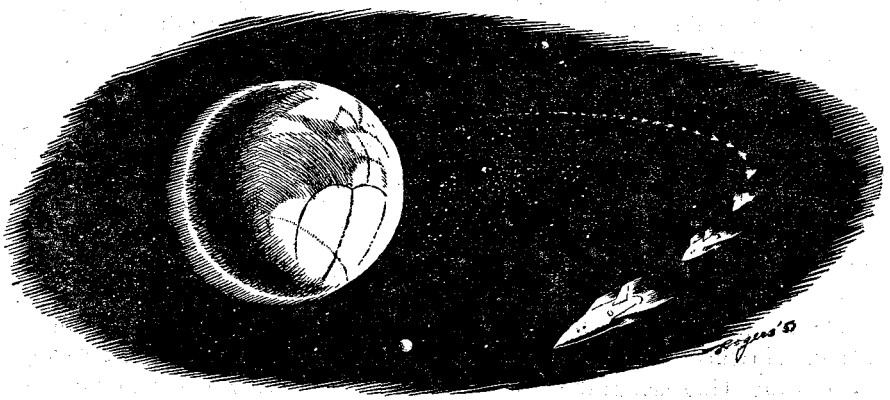
It was stated that these vast dust beds may be as deep as four or five miles in places, thus effectively hiding the craters beneath.

Partial confirmation of this challenging hypothesis has already been obtained from spectroscopic measurements of the polarization of the light reflected from the Moon's surface, which suggested that the first few millimeters of the surface was dustlike. Our experimental limitations keep us, of course, from probing farther beneath.

It is amusing to consider some of the possible consequences of the millions of years of actinic erosion. Metals which occur in the free state, such as gold, silver, or platinum would not be subject to this flaking action because of their high thermal conductivity and ductility. But the rocks in which they occur would be —so it may very well be that the first lunar mining may be done with a broom and dustpan by a spacesuited prospector who sweeps off the mountain tops.

And I don't know, either, about that old suggestion that the airless surface of the Moon would be a fine place to set up a factory for the manufacture of vacuum tubes without glass or metal bulbs. All these positively charged particles would be most happy, no doubt, to migrate from all over to land on your negatively charged cathodes and grids.

There is one possibility, however, that might be interesting to look into some day. On Earth, we have placer mining where the densest materials have collected in pockets in stream beds. Much of the world's gold and platinum has been concentrated in this way, and later found by man. It may be that a similar process of sorting by density can go on in this semifluid macromolecular state of dustiness on the Moon's surface. And among the densest nonmetallic materials found in nature are the compounds of uranium.



THE END

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METEORITE CRATERS

BY WILLY LEY

***There are** meteorite craters scattered all over the face of the Earth. Too bad that they are all in such inaccessible regions — or is it? It would be interesting if there were a nice, handy crater in the middle of New York City, or Los Angeles — but not, please, a fresh one!*

Nature needs from one hundred thousand to five hundred thousand years to push up a mountain range that can be seen from a distance. A river needs, even when working at a rather fast rate, some ten centuries to carry enough sediment into the sea so that a one-inch layer of sandstone will be the final result. If a coastline recedes fast, it does so at the rate of a foot or two per century and those continents which are still rising after having been weighed down by the glaciers of the Ice Age gain around half an inch per century. In short, it takes time to make a map.

A single geological feature may originate somewhat faster. A volcanic cone can build up in a decade and a below-sea-level valley near the shore may be drowned in hours. But there is one, just one, geological feature which is formed instantly, so fast that it would be difficult to photograph even if a camera were mounted in the proper place. That difference from the norm is caused by the fact that it is not strictly a "geological" feature. I am thinking of meteorite craters.

The realization that there is such a thing as a meteorite crater is in itself only about half a century old. Now, at the end of such a fifty-year span, we can say that somebody was bound to have this idea at some time during that period. As it actually happened, this knowledge was derived directly from the one mete-

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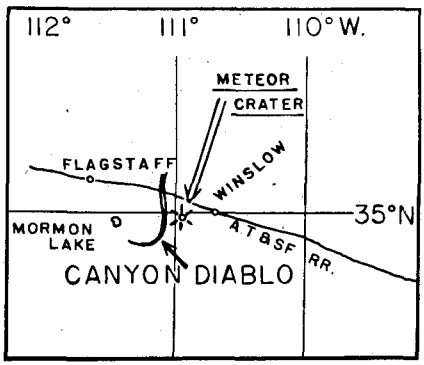
orite crater which now bears the name of Meteor Crater, also known as the Canyon Diablo or Arizona Crater. It was the first to be discovered or rather recognized and for decades it was thought to be unique. After it had lost the distinction of uniqueness it was still thought to be the largest for a long time. And while even that is no longer true it does have the very useful distinction of being the only big meteorite crater which an average inhabitant of the Western Hemisphere can hope to visit and see for himself. The distribution of meteorite impacts is, of course, random and so far large meteorites have — quite fortunately for us — picked inaccessible places; mostly in localities the names of which puzzle even a geographer at first hearing.

Arizona's Meteor Crater, situated in a flat plain at the outermost fringes of the Painted Desert, became first known in about 1890. There are no reports or travel diaries to prove it one way or another, but it is quite possible that a considerable number of people passed it within a few miles without paying any attention to it. Seen from a few miles away it appears as a mile long flat topped hill, looking far less intriguing than the mesas you can see farther on. One would have to climb the one hundred twenty feet of that "hill" to see how strange a formation it is, a completely closed wall without any valley or pass leading into its interior. The distance across, from rim to rim, is over four thousand feet and while the rim is only between one hundred twenty and one hundred fifty feet over the surrounding plain, the center of the gigantic hole is some six hundred feet below the rim. On the outside the slope of the wall is reasonably gentle, on the inside very steep, vertical for some distance in places.



Map of the position of the classical example, Meteor Crater in Arizona, which happens to be the most accessible of any. U. S. Highway 66 parallels the railroad spur shown and passes some seven miles from the crater; a secondary road runs from U. S. 66 to the foot of Meteor Crater.

The area attracted attention first not because of the crater but because of the many iron meteorites which could be picked up from the ground. In fact the first scientist to inspect the crater, A. E. Foote, had traveled to Arizona because of the meteorites. He mentioned in an article which he published in 1891 in the *American Journal of Science* that many meteorites were near the base of the elevated rim. As for the

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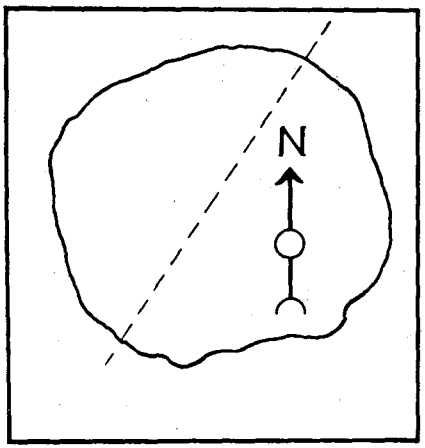
crater itself he simply stated that he felt "unable to explain the cause" of the formation. Possibly because of this remark, the chief geologist of the United States Geological Survey, Grove Karl Gilbert, made a trip to Canyon Diablo and inspected the site personally. He concluded that Coon Butte, as it was then called for some reason I don't know, was the result of a steam explosion caused by volcanic action.



Unlike Chubb Crater, Wolf Creek Crater and most of the others, the Arizona Meteor Crater is not circular. This outline of the rim is traced from a photograph taken from an altitude from more than thirteen thousand feet vertically above the crater. Meteor Crater may be called a square with rounded corners. Dotted line refers to cross section.

To us this hastily contrived and authoritatively stated explanation sounds like an extraordinarily potent example of inconspicuous incompetence because there is no sign of present or past volcanism for a long long distance around. But in fairness it has to be said that the area was not as well known then, it was still possible to think that there ought to be some volcanism somewhere. Furthermore, no other meteorite crater was known at that time, and although the idea that the ringwalls of the moon might be impact craters was already under discussion in astronomical circles it was not something about which astronomers were in full and beautiful agreement. And G. K. Gilbert was a geologist, he was not really obliged to know anything about undecided astronomical problems.

I think that some astronomers were the first to point at the similarity between the lunar "craters" and Coon Butte, but the man who did most to advocate the explanation as an impact crater was Dr. D. M. Barringer who was, by profession, a mining engineer. The Canyon Diablo crater, Barringer said, was not only located in an area otherwise devoid of volcanic phenomena, it also lacked all the features which could be expected of something of volcanic origin. What did distinguish the area was the great abundance of meteoric iron. Since this was highly unusual, wasn't it logical to connect it with the equally unusual crater and to ascribe the latter to a very large meteorite?

Barringer then went ahead proving his contention, spending much

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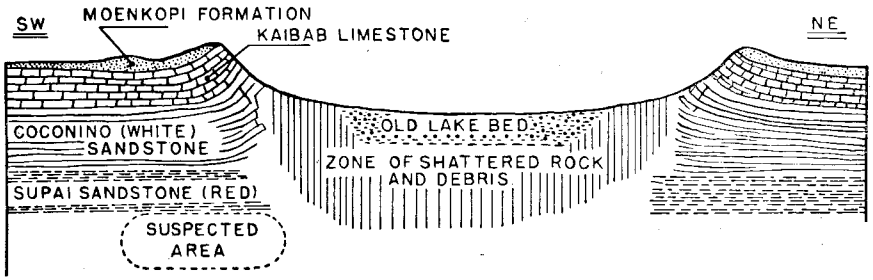
time and money in the course of the work. In the Canyon Diablo area there were several geological formations neatly stacked up in undisturbed horizontal layers. At the surface there is what geologists call Moenkopi, covering a layer of Kaibab limestone, the latter resting on white Coconino sandstone. The white Coconino, in turn, rested on red Supai sandstone—a well-ordered sequence like an idealized drawing in a geology book. But where the crater was, the Moenkopi had disappeared, the Kaibab limestone broken and lifted up around the edges and the Coconino sandstone likewise. Red Supai, being rather far down, had not actually been tilted up any more, but had been shattered. The floor of the crater, not counting sediments of an old lake which had been there for some length of time, was shattered and sometimes fused rock and débris, a test boring had to go almost one thousand feet deep to reach undisturbed ground material.

When Barringer summed up his researches in 1909 it should have been clear to anybody that he was right. But things did not go quite as smoothly. Barringer's well-documented story was received in a manner which is of psychological interest. To state it shortly: he was generally disbelieved, at least, or rather especially, in the United States. In Europe—a fact which is little known and never mentioned—the Arizona crater was accepted as a meteorite impact crater; presumably Arizona was so far away that anything seemed possible in such a distant place. In the United States it was different; to people who had not themselves seen the crater it seemed to be the opinion of the mining engineer Barringer against that of the chief of the United States Geological Survey. How was one to tell that Gilbert's statement had



Cross section of Meteor Crater along the dotted line of the vertical view. The formations near the surface are broken and tilted, the red sandstone layer seems to have remained comparatively undisturbed, except for being crushed under the crater floor. Depth of zone of shattered rock is unknown, there were too few test borings for an accurate estimate, nor did they go deep enough. The spot labeled "suspected area" is where some thought the "main mass" had to be buried.

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been hasty and ill-considered? And Barringer himself had made a mistake too. It was one which he could hardly have avoided under the circumstances but it backfired just the same.

Judging from the many pieces of meteoric iron in the vicinity, Barringer had concluded correctly that the meteorite which produced the crater must have been an iron meteorite. Analysis of the smaller pieces showed that the iron contained, as usual, a good percentage of nickel and traces of other metals, among them a platinum trace of unusual strength. There were also occasional tiny diamonds imbedded in the iron, of poor quality and more or less microscopic in size, but diamonds. Since the meteorite was estimated to have weighed a million tons, it represented a very considerable fortune, even discounting the possibility of industrial diamonds and the platinum trace which alone worked out to some eight hundred tons. Barringer's field work had been financed by mining interests and logically the proof of the impact origin of Meteor Crater had slowly become incidental. The chief interest centered upon discovery of the "main mass" of the meteorite. Somewhere under the crater, Barringer said, that "main mass" had to be buried—and his financiers had visions of eight hundred thousand tons of metallic iron, fifty thousand tons of nickel, and tons of platinum and chromium. At first Barringer thought that the meteorite had fallen vertically and sank test holes in the center of the crater. Then he reconsidered and accepted the possibility of a slanting impact, probably from a northeastern direction so that a place below the southwestern rim seemed logical.

Barringer's continued failure to find a "main mass" not only hampered his own work—from the financial point of view—it also gave aid and comfort to those who still adhered to the mysterious steam explosion. As recently as five years ago somebody in Washington "decided"—most evidently without any investigation—that Meteor Crater should be regarded as of volcanic origin "because no main mass has been found." However, this bright light is now a lone dissenter, everybody qualified to judge now agrees in substance, if not in detail, with the late D. M. Barringer.

The shift in general opinion took place soon after the first World War, influenced, no doubt, by the discovery of other meteorite craters. The second to be discovered happens to be in the United States, too. It is located near Odessa, Texas and is quite large, about five hundred sixty feet in diameter. Evidently it is of high age, the crater itself is largely filled in and now hardly more than sixteen feet deep. The Odessa crater was later joined by one or two subsidiary smaller craters which had been even more thoroughly obliterated in the course of time. Only a few years after the discovery of the Odessa crater an

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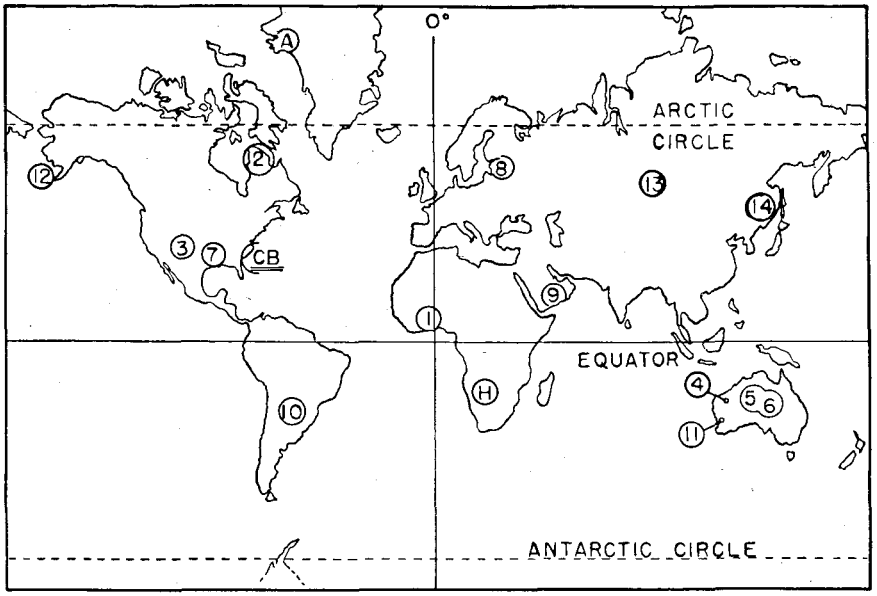

Sites of major meteorite impacts on Mercator Map of our planet. The numbers refer to the meteorite craters as listed in the article. (A) is the site of *Ahnighito; (H)* the site of *Hoba West* (Grootfontein), and (CB) the area of the disputed Carolina Bays.

old round lake on an island in the Baltic was recognized as an impact crater. A few years after that a group of thirteen craters was found in Central Australia and another two years later two craters turned up in Arabia.

They came so quickly that in 1934 Professor Dr. K. Graff of the Hamburg Observatory wrote an article in which he spoke of "meteorite craters as a more frequent feature of the earth's surface." This may have been a slight exaggeration then, but it is no longer. By now a total of about a hundred impact craters are definitely known and a large number of other spots are suspect.

The list on page 89 contains all reasonably large impact craters which have been recognized as such by their investigators. While the characteristics of an impact crater are quite obvious once you know what to look for, it has become customary to demand the presence of meteoric matter as one of the criteria. This is the case for all those listed, except for the exceptions one always has to make from time to

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LIST OF KNOWN METEORITE CRATERS OF 100 FEET DIAMETER OR LARGER IN ORDER OF SIZE

	Name and number of craters	Location		Diameter of largest crater, rim to rim	Year of Discovery	Probable Age (years)
1.	Bosumtvi(Busumchwi) Lake (1)	Ashanti (Gold Coast, Africa)	7° N. 1° W.	6.5 miles	?	?
2.	Chubb Crater (1)	Northern Quebec	61° 17′ N. 73° 40′ W.	11,000 ft.	1942	10,000+
3.	Meteor Crater (1)	Arizona	35° N. 111° W.	4,150 ft.	1891	7,000
4.	Wolf Creek (1)	N.W. Australia	128° E. 19° S.	2,700 ft.	1947	1,000+
5.	Henbury (13)	Central Australia	24° S. 133° E.	660 ft.	1931	200 ?
6.	Boxhole (1)	Central Australia	22° 37′ S. 135° 12′ E.	575 ft.	1937	2,000 ?
7.	Odessa (2)	Texas	32° N. 102° W.	560 ft.	1921	50,000+
8.	Kaalijärv (7+)	Island of Oesel	58° 25′ N. 22° 50′ E.	330 ft.	1827 (expl. 1927)	15,000
9.	Wabar (2)	Arabia	17° 30′ N. 52° E.	330 ft.	1932	1,000 ?
10.	Campo del Cielo (20+)	Chaco Argentina	26° S. 60° W.	250 ft.	?	?
11.	Dalgaranga (1)	Western Australia	27° 45′ S. 117° 05′ E.	230 ft.	1923	2,000 ?
12.	Keenan Crater (1)	Amak Island	55° N. 164° W.	210 ft.	1942	?
13.	Siberia-1908 (20+)	Stony Tunguska	60° 55′ N. 101° 57′ E.	150 ft.	1923	1908 June 30
14.	Siberia-1947 (50+)	Sikhota-alin mountains	49° 10′ N. 134° 40′ E.	100 ft.	1947	1947 Feb. 12

time. It is, for example, most doubtful whether anybody ever found any meteorites or fragments of meteorites in the case of No. 13 (Siberia—1908). But since this particular meteorite landed in what amounts to a swamp that is hardly surprising.

The largest impact crater known at the present moment is, unfortunately, the least investigated. Again, not too surprising; this time in view of the location which is Ashanti in Africa, quite near the equator. The crater forms a circular lake six and one half miles in diameter and has been known—as a lake—for a long time, possibly since the days of the Portuguese explorers. But that doesn't make it any easier to investigate, it would be a major feat to get lake bottom core samples to the necessary depth of about two thousand feet under these circumstances.

The second largest impact crater known is a lake too, but this time practically in the Arctic, in the

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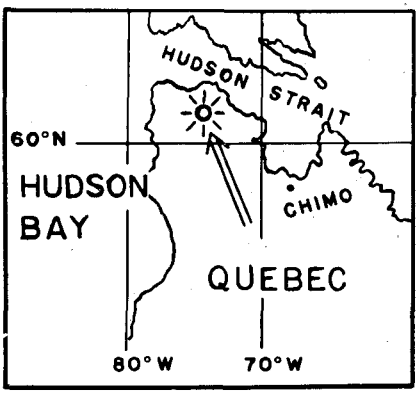
northernmost portion of Quebec. It is only a matter of a comparatively small number of miles and the meteorite would have landed in Hudson Strait, producing a spectacular splash at the time but remaining forever undiscovered afterwards. This crater was photographed from the air in 1942 by a United States military airplane on a routine flight and a number of years later by survey planes of the Royal Canadian Air Force. It was duly entered on charts and the amusing thing is that the cartographer gave it an irregular shape, something like the outline of the Pentagon Building drawn free-hand by a poor artist. The cartographer apparently could not quite convince himself even by photographs that this was a circular lake. No lake is perfectly round—except when it sits in a perfectly round hole, smashed into solid granite by a large meteorite. The ringwall is three hundred feet high on the average, with two high points of five hundred fifty feet each. There are several sets of fifty-foot "ripples" in the granite far outside the crater, caused by shock waves transmitted through the rock.



Map of the location of the largest meteorite crater in the Western Hemisphere, Chubb Crater in northern Quebec.

The crater is now named after a prospector, a Canadian by the name of F. W. Chubb who had obtained some of the aerial photographs and called them to the attention of Dr. V. B. Meen, the director of the Royal Ontario Museum of Geology and Mineralogy. Both men were convinced by the pictures that this was a crater. Mr. Chubb hoped for an extinct volcano, knowing that diamonds are sometimes found in extinct volcanoes. Dr. Meen tended from the outset to consider it a meteorite crater. In July 1950 they flew North together and, after having located the crater from the air, landed as near as possible to it for exploration on foot. It is certainly an impact crater, but there was not much time for an extended and thorough search for meteoric matter. That, as well as detailed exploration, had to be left for the future. Unfortunately Chubb Crater is located in very difficult territory.

The fourth largest impact crater —No. 3 is the one in Arizona—is also a recent discovery. It was found from the air by two American scientists, Dr. Frank Reeves and Mr. W. B. Sauve who were flying on a prospecting expedition for the

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Vacuum Oil Company. That was in 1947. Years later it turned out that the crater had been seen by a white Australian in 1935. He was a constable — we'd say state trooper — who was led to it by a native guide. But the constable did not see anything unusual in this formation, he was, at any event, sure that no law had been violated and that he did not need to write a report. Wolf Creek crater, as it is now called, is in a semiarid region in northwestern Australia, measuring twenty-seven hundred feet across with a rim over one hundred feet high. It shows little signs of erosion and cannot be very old, but erosion works relatively slowly in this area so that "not very old" means at least one thousand years. Inside the crater trees are growing, some of them with a trunk diameter of two feet. Wolf Creek crater has been investigated twice, the first exploring party was headed by the two scientists who discovered it. Like our Arizona crater, the Wolf Creek crater was punched into sandstone layers.

The investigators were especially careful to hunt around for native legends, without success. The reason why they investigated this point is that there seems to be a native legend about another meteorite crater in Australia, or rather a group of them: the Henbury craters. According to A. R. Alderman the Australian natives refer to the Henbury site as *chindu chinna waru chingi yabu* which is translated as "sun walk fire devil rock". That, of course, sounds very much like a description of a meteorite impact, within the limitations of the language in which it is delivered.

With that we unfortunately get into the old discussion about the length of time oral history will survive. Personally I hold that the oft-quoted examples of the Vedas and of the Odyssey do not apply in such a case. It is true that they were transmitted for long times by word of mouth, but they had the advantage of being art forms, poetry, which can be learned and remembered much better than everyday speech. And the Australian aborigines do not have anything corresponding to either rhymes or hexameters or alliterative measures to the best of my knowledge. For this reason I have entered the probable age of the Henbury group as two hundred years on the list, always assuming, of course, that the "sun walk fire devil" remark is actually a reference to the fall.

The Henbury group comprises thirteen craters. The smallest of them is only thirty feet across. In it, some ten feet below ground level, four pieces of meteoric iron were found, apparently the remains of a single mass which originally weighed around five hundred pounds. The largest of the Henbury craters is very decidedly elliptical, the only one of that shape known on earth so far. Since a single meteorite striking the ground is always apt to make a more or less round hole, whether it falls vertically or not, this

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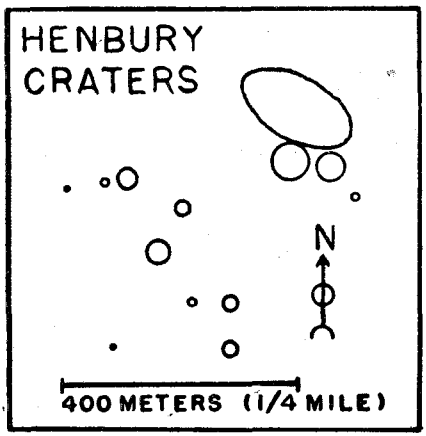
elliptical crater is best explained by the assumption that two large meteorites struck simultaneously a short distance apart, so that we are here dealing with the overlapping rims of two craters. (On the moon you can see this in all stages, from two close but still separate craters, two touching craters forming a figure 8, two still closer craters forming a figure 8 with the central divising line missing to a single elliptical crater like the main crater of Henbury.) The dimensions are: six hundred sixty feet measured along the long axis and three hundred sixty feet measured along the short axis.

The Henbury group did not remain a unique example of impact



The Henbury craters of Central Australia.

craters in Australia even before Wolf Creek crater was discovered. In fact their discovery had been preceded by the much less publicized discovery—in 1923—of a crater in extreme western Australia which is labeled the Dalgaranga crater. It is rather shallow, being only fifteen feet deep with a rim diameter of two hundred thirty feet. This indicates a high age, as in the case of the Odessa crater, erosion had time to go to work on it. The meteoric iron found near the Dalgaranga crater, however, happens to resemble that of the Henbury group. After the latter was discovered another large impact crater was found in Central Australia, only some two hundred miles to the northeast of the Henbury group. This crater, called Boxhole crater, measures five hundred seventy-five feet from rim to rim, but the rim is only from ten to fifteen feet high and the average depth of the crater is only about forty feet. It is evidently quite old too, comparable in age to the Dalgaranga crater.

That all these craters turned up in recent times in sections of Australia which had been explored only superficially, if at all, was not very surprising. But the discovery of a group of impact craters on an island which has been inhabited since the end of the last glaciation and through all recorded history is somewhat more unusual. The island in question is best known under its German name of Oesel—the name itself is just a version of an old German word meaning "island"—but some maps call it by its Estonian name of Saaremaa. It lies in the Baltic Sea, across the mouth of the

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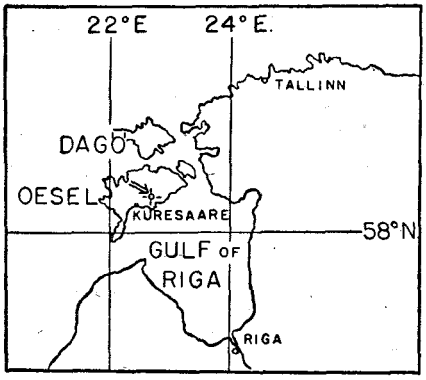
Gulf of Riga. Its chief town is Arensburg—in Estonian Kuresaare —which means "Aren's Castle" and the land to the northeast of Arensburg belonged to what was known as the "Sall Estate" which during the last century was owned by the von Moller family.



Map of the island of Oesel and location of the Kaalijärv crater group near Kuresaare (Arensburg).

On the Sall Estate there was a little round lake, some two hundred feet in diameter which was and presumably still is surrounded by trees. It was actually a circle of trees, growing on a circular rim. The highest point of this circle was a very pretty "lover's lane" and Herr von Moller decided at some time that all this could be prettified a little more. He had workmen break through the rim above lake level at one time to make the lake more accessible. He built himself a small garden house there. And he made his workers row to the center of the lake and dump rocks there, as heavy as the boat would carry. The idea being that he wanted a small island in the center on which he wanted to erect a statue of an ancestor. But the rocks had a habit of sinking into the muddy lake bottom, the planned artificial island never broke through the surface and the statue was postponed indefinitely.

Although the Lake of Sall, or to give the Estonian name under which it then became famous, the Kaalijärv, must have been there for several thousands of years it is first mentioned in print by a local historian by the name of J. W. L. von Luce. He reported in 1827 that he had not succeeded in measuring the depth of the lake. Since his method consisted in pushing a pole vertically into the water from a boat and counting the time until that pole would re-appear at the surface his failure is quite understandable.

Precisely a century after von Luce's "experimentation" the Lake of Sall or Kaalijärv was investigated by scientists from the Department of Geology of the University of Tartu—Dorpat—but most especially by the Estonian mine inspector Ivan Reinwald. As the general description of a round lake within a raised rim has clearly enough indicated, Kaalijärv was an impact crater. And it was not the only one, there were six smaller ones which Reinwald labeled with the numbers 1 – 6. In addition to those six there were a number of suspicious holes in the

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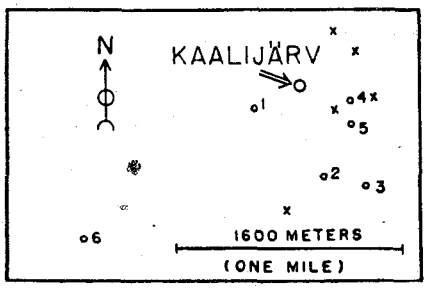
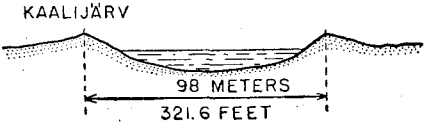
fields nearby. These holes are definitely not man made, but the local peasants made them almost disappear, they were wonderful places for the dumping of rocks which had been plowed up in the fields.



Kaalijärv and subsidiary craters on Oesel. The smaller craters just bear numbers from 1 - 6. Small crosses mark the positions of filled-in holes which may be additional craterlets.

Ivan Reinwald satisfied himself by careful investigation and measurements that the biggest of the impact craters, Kaalijärv, actually was an impact crater. But Kaalijärv was too large to excavate—even if he had had the means to do so he probably would not have wanted to destroy the ancient landmark—so Reinwald turned to No. 4, which is about sixty-five feet in diameter. It showed all the typical characteristics of a meteorite crater, tilted up rocks around the rim, a layer of pulverized ground rock, et cetera, et cetera, but no meteoric matter at all. This lack was easily explained by the fact that the island was "always" inhabited. Any piece of meteoric iron which had come to light in the past quickly found its way to the village blacksmith to be converted into a knife, boathook or other useful implement. Still, the lack of meteoric iron caused a few overly cautious people to label the Oesel craters "probable." If he did not want this designation to last, Reinwald had to find meteoric iron. There were no magnetic mine detectors then, with the aid of which he probably could have located some meteorites in the vicinity of Kaalijärv beyond plowing depth. This instrument has been used with great success in this country by H. H. Nininger, to Reinwald it was still a question of pick-ax and shovel and hopes for the best.



Section through Kaalijärv according to Reinwald.

In 1937 he could report that he had succeeded. Small pieces of meteoric iron were found both in the small crater No. 5—forty-five feet in diameter—and in the northern part of crater No. 2. This No. 2 is a double crater of the type that looks like a figure 8 with the central dividing line missing. Its largest diameter is one hundred sixty-four feet; if the two portions were separate craters the larger would measure one hundred twenty feet in diameter

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and the smaller not quite one hundred feet. The smaller portion in which iron was found is the northern part of the double crater.

No such problem confronted the South Americans with their crater field of Campo del Cielo in northern Argentina. There meteoric irons were lying about in profusion, the heaviest of them is estimated to weigh at least a ton and several others come close. Unfortunately not much else can be reported about this group of craters which is a pity for from what is known about it it seems likely that it is the most numerous, rivaled only by No. 14 of our list, Siberia—1947.

The two craters of Wabar in the Rub'al Khali desert of Arabia differ from others in that they were made in desert sand. Because of the steady shifting of the sands of the Arabian desert it is difficult even to determine their original size, they are just depressions in the sand, the larger circular with a diameter of about three hundred thirty feet, the smaller elliptical with a large diameter of one hundred seventy feet and a small of one hundred thirty feet. They cannot be very old or else they would have disappeared by now, in the Arabian sand desert even a meteorite impact will not last indefinitely. This conclusion appears strengthened by mention of an apparently mythical city of "Ubar" in old Arab writings. Ubar, it is stated, was destroyed by fire from the heaven. The investigator of the Wabar craters, the Englishman Philby, is of the opinion that there never was a real city in that spot but that the city was invented after the event because the craters were explained as former city walls and the impact débris as ruins of buildings. If an Arabic scholar traced the mention of "Ubar" back through his literature he might uncover a clue as to the approximate date of the meteorite crash.

The plentiful impact débris of Wabar is especially interesting. There are remains of the meteorite itself—another Arabic name for the place is al Hadida, "Place of Iron"—and there are heaps of irregular pieces of silica glass, sand fuzed together by the heat of the impact. And because of the sand we can, for this case, get an idea of the heat which prevailed there momentarily. The sand was not only melted, as dewdrop-like accumulations on the outside of bigger pieces show it was even vaporized. The melting point of silica is 1710° C. (=3110° F.) and its boiling point is 3500° C (=6240° F). And in some of the pieces you can see tiny globules of iron imbedded in the glass—vaporized iron and vaporized silica condensing together. But condensing in a manner which one would expect in a vacuum, not in atmosphere. At least the oxygen must have been temporarily absent, it was presumably all used up by combination with iron vapor and because of the expanding vapor cloud no new oxygen could get to the spot.

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Canada's Chubb crater, you remember, was originally a wartime discovery but would have been found later anyway. But "Keenan Crater" was found during the war because of the war and it is most unlikely that it would have been discovered otherwise. For it is located on Amak island, a tiny island due north of Unimak island which is actually just a cut off portion of the tip of the Alaskan peninsula.

The story of how information about the crater came to light is a curious tale in itself; it involves, of all places, the White Sands Proving Ground in New Mexico. The sequence was as follows: Dr. J. A. Hynek of Ohio State University had to go to White Sands on government business. Being in New Mexico he visited the University of New Mexico and Lincoln La Paz of the university's Institute of Meteoritics. They talked about meteorite craters and contraterrene matter and some time later Dr. Hynek wrote to Professor La Paz that another colleague, Dr. P. C. Keenan, had a brother who had been an infantryman during the war and had been stationed for two years on Amak where he saw what was in all probability a meteorite crater. The formation was known to all the soldiers stationed on the small island and was referred to as the "Hollywood Bowl."

Lengthy correspondence between Lincoln La Paz and Mr. Keenan revealed a number of facts. The crater is situated directly at the south shore of Amak island which has two small mountain ridges but is otherwise a tundra plain, rock strewn and overgrown with moss. The crater, circular in shape, is two hundred ten feet in diameter and about fifty feet deep, its whole area overgrown with moss looking as old as the moss elsewhere on the island and forming a layer about a foot thick. The crater is in a precarious position. There is a narrow rocky beach, then a vertical "dirt cliff" and the crater just on top of it. At the narrowest point only one foot of tundra separated the rim of the crater from the rim of the cliff at the time infantryman Keenan was there. Under the circumstances no meteoric iron was collected, but the whole description fits an impact crater and nothing else.

Before I proceed to the two Siberian crater groups which have the distinction of having been formed by meteorites that were seen to fall I want to mention two small craters not on the list. One is the best explored of all, a forty-foot crater near Brenham, Kansas, which was thought to be an old "buffalo wallow" by the local population. It probably was one at one time, but originally it was a meteorite crater which was excavated completely by Dr. H. H. Nininger in 1933. There were numerous meteorites in the vicinity, in the crater itself a number of specimens of the same type were found, weighing up to fifty pounds apiece.

A small crater situated right in

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the center of a high mesa in northeastern New Mexico, seven thousand feet above sea level, was seen from the air in December 1948 by Major Charles L. Phillips of the Air Force. Major Phillips memorized its position in order to fly a photographer over the crater at low level in order to obtain pictures. Later he succeeded in the more than just difficult task of landing a small plane on the mesa to measure the crater which he found to be thirty feet in diameter and three feet deep. It is quite "new" looking and its inner slopes are not yet completely covered by vegetation. Although New Mexico is not precisely uninhabited, this particular area is and the crater is easily accessible only by helicopter. Lincoln La Paz has suggested that this might be the point of impact of the main mass of the so-called Pasamonte Ranch, Union County, New Mexico fall, "although the location of the crater is much farther south and west than might have been expected on the basis of the actual recoveries so far reported from that fall."

And now we get to Siberia and to a tale which has, as one might expect, a typical Russian flavor. But let's get the locality straight first. In Central Siberia there are three rivers. One is called the Verkhnaya Tunguska, which means Upper Tunguska. Another one is called the Nishnaya Tunguska, which means Lower Tunguska. But the one between these two is not called Middle Tunguska, it is known to most astronomers, many geographers and some Russians as the Podkamenaya Tunguska, which means Stony Tunguska. The great Siberian meteorite of 1908 fell in the area of the Podkamenaya Tunguska where the landscape consists of wooded shallow swamps resting on permanently frozen clay. In the early morning hours of June 30, 1908 many people in Central Siberia saw a fiery body come up over the southern horizon, moving rapidly due north. Some compared it to a small sun, others just said that it was too bright to look at it. Less than a minute later, as one of the eye witnesses put it: "the ground suddenly rose and fell again, like a single wave in the sea, but nothing near me was destroyed."

Immediately after that—I am now quoting from the *Doklady* (Reports) of the Academy of Sciences of the USSR, Vol. XXII, No. 8, 1939, by L. A. Kulik—"a pillar of fire mounted up to the sky and immediately three or four distinct and powerful blows of incomparable force and timbre were heard accompanied by a roar and rumbling. The blows were heard over an area with a radius of more than 1000 kilometers (600 miles). They were accompanied by mechanical effects: the water in the rivers were driven in huge waves, men and beasts were knocked off their feet, many buildings were damaged, fences thrown down, houses shook and suspended

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objects in them began to swing. The atmospheric wave . . . traveled twice around the globe . . . the seismograph with a Repsold pendulum in Irkutsk showed an amplitude of about 2 millimeters and the recording lasted approximately one hour and a half. At dusk, the same day, enormous silver clouds were seen at an altitude of 83 kilometers, which almost turned the night into day throughout the continent, from the basin of the Yenissei River to the Atlantic (this probably is a miswriting with "Pacific" as the intended word; W. L.) and even to the Black Sea."

This, one should think, was spectacular and noticeable enough to merit immediate investigation. Well, yes . . . and the German scientific monthly *Kosmos* even stated in a fall issue of 1908 that "recent disturbances in the atmosphere can be explained only by a cosmic cause." But the Russians apparently put the whole down as an earthquake not worth specific mention. The only thing that was printed in Russia at the time were some eye witness accounts in provincial Siberian newspapers. The only one who paid attention to them was a small publisher who issued calendars with detachable leaves and who was in the habit of reprinting interesting newspaper stories on the backs of the leaves to provide his customers with reading matter. The final "discovery" of the Podkamenaya Tunguska meteorite took place because somebody had used the leaf with the reprint as a bookmark and Professor L. A. Kulik found it accidentally in a library during the winter 1920/21. Then he pulled what strings he could to get equipment and transportation to look for the impact point.

The Tunguses did not want to guide him. One should not approach the place from which the thunder god *had risen to the clouds*. But then Kulik did reach the area where all trees had been knocked down over a circle measuring twenty miles in diameter, still there 18 years after the event. The Tunguses admitted, reluctantly, that two villages had disappeared. But in the center of the area of the broken trees there were only a number of large water-filled holes in the ground, no typical crater had formed in the swamp.

Another large meteorite smashed into Siberia in the extreme east on February 12, 1947. It was seen over a large area and the school teacher of the village of Novopokrovka had the presence of mind to note down the time on the margin of an open book which happened to be handy. It was 10:35 a.m. local time. The meteorite left a black trail in the sky which persisted for hours and which pointed to the Sikhota-alin mountains as the impact point. That point was also marked by a twenty-mile high column of brownish color, no doubt composed of impact débris and vaporized snow. This time an expedition was organized at once, under the leadership of Professor Vassili Fessenkov, an astrophysi-

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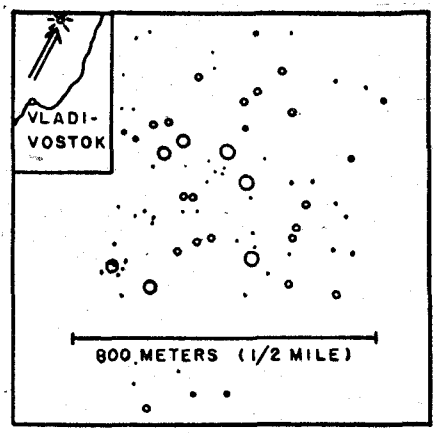
cist. When they found the impact point they counted half a dozen large and several dozen small impact holes. Many trees had been broken down. Others were shot through with holes from ricochetting pieces of the meteorite, outgoing from the craters. The holes indicated an angle of fifty-two degrees for the rebound. The pieces which were actually found, were curiously torn and twisted, looking like pieces of armor plate which had suffered direct hits of heavy siege artillery. The total mass of the meteorite has been estimated as comparable to a large living room which leads to quite some weight for solid iron.



"Impact Area" of the Siberian meteorite of February 1947.

It is interesting and also important that the largest meteorites known are not associated with craters. Discounting the story of an iron meteorite three hundred twenty-five feet long and one hundred forty-six feet high which a French expedition claimed to have discovered in French West Africa in 1921, the largest known is the iron meteorite of Hoba West, near Grootfontein in Southwest Africa. It is still *in situ* and measures about ten by nine by three feet with an estimated weight of seventy-six thousand pounds. Next largest is Ahnighito from Cape York, Greenland, the biggest of four large iron meteorites found there. Ahnighito is now in the Hayden Planetarium in New York and the latest figure for its weight is seventy-two thousand six hundred pounds; all four together probably weighed about twice that much. Of course Hoba West and Ahnighito are merely at the top of a long list of other heavyweights, but one has to go pretty far down in that list to find one which was associated with a crater.

Crater formation is, of course, entirely a question of impact velocity. If a meteorite had no velocity relative to earth at all and fell just because of the earth's gravitational field, it would strike the ground with seven miles per second, minus whatever figure air resistance managed to strip off those seven miles per second which represent the integral of the earth's gravitational field. But meteorites do have a velocity of their own which might even add itself to the orbital velocity of the earth—that would be the case at dawn—resulting in a figure which could be as high as forty miles per

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second. Now the terminal velocity of such a body—meaning the velocity where gravitation and air resistance balance each other — would be less than nine hundred feet per second. Apparently in small meteorites which are not too fast to begin with, air resistance succeeds in whittling down the velocity to close to terminal velocity: some meteorites of a size which a man could easily carry were seen in flight just before impact, like an old-fashioned cannon ball.

But in the case of a large meteorite air resistance cannot do much, and all the energy of the moving body is still present when it strikes the ground. The velocity can be stopped, but the energy has to go somewhere and appears as heat, with results like those observed around the Wabar craters. Meteorites like Hoba West and Ahnighito are strange freaks for this reason. Ahnighito, it could be ascertained, struck a slope and probably at a time when it was covered with fifty feet of snow. Hoba West may have hit at relatively low velocity in slanting fall on a thick layer of loose sand which later blew away. An iron meteorite of 1760 pounds found in a field at shallow depth in Georgia in 1941 is believed to have fallen when Georgia was covered by a shallow sea.

But the normal thing for a large meteorite is a full scale high-velocity impact which vaporizes most of the meteorite and some of the ground with it, forming the crater by what amounts to an explosion — for any explosion is simply the sudden generation of large quantities of gas. Therefore the concept of a "main mass" in the ground is supremely silly, as has been pointed out time and time again. Alfred Wegener was the first, in about 1922, to state categorically that there cannot be a main mass. Reinwald repeated: "there is no main mass." Nininger came to the same conclusion. And that statement can be improved in only one way, namely by saying: there is no main mass *after impact.*

That the main mass may rebound into space is so ridiculous an idea from the point of view of thermodynamics and ballistics that it does not need to be discussed at all. Barringer, with his endless and expensive search for a main mass, was simply wrong. But the generally unknown non-circularity of the Canyon Diablo crater suggests that there might not have been a "main mass" even before impact, the meteorite probably consisted of several large pieces traveling together.

Only a few doubtful cases remain to be added. One is the so-called Pretoria salt pan in Africa. It does resemble a shallow meteorite crater, *many* miles in diameter. But so far only its shape is suggestive, much more evidence is needed to permit a decision.

The same holds true, but possibly to a somewhat lesser degree, for the famous and much-discussed Carolina Bays. In the coastal plain of

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both Carolinas and of the northern portion of Georgia there are many hundreds of shallow elliptical depressions, many of them filled in with peat bogs. One was excavated and could be dated by the pollen found. This particular "bay" and presumably all the others too originated during the late stages of the glacial period. One of the typical larger "bays" is "Jerome Bog," which has a long axis of slightly less than 7000 feet and a short axis of 4250 feet. Its long axis deviates from the meridian by about 45 degrees, which is the average for all the "bays." Their long axes are not precisely parallel but produce a figure like a small segment of a many-spoked wheel. One hypothesis to account for the origin of the Carolina Bays is, of course, that they were caused by an enormous shower of meteorites, possibly the collision with the head of a comet.

All alternate explanations working without meteorites are quite weak. And the objections of their defenders against the meteorite hypothesis are even weaker, the principal one being that no meteoric matter has been found.

The trouble is that the meteorite hypothesis has a few weaknesses of its own. While the overall picture looks strikingly like the result of a meteoric shower, a single bay does not. The bays lack the well-defined explosion rim of a typical meteorite crater. And their proportions are not right, the Jerome Bog, for example, is only 11 feet deep. If one goes by the customary ratio one should expect it to be 400-700 feet deep. That they are all elliptical is another difficulty, one cannot very well expect all the meteorites to have traveled in pairs. Since the overall picture can be explained by a meteorite shower and by nothing else, one has to make the slightly uncomfortable assumption that there was a powerful modifying factor present which does not apply in any of the other cases. One such assumption would be that the coastal plain was covered by shallow water at the time. We do not know at the present moment just what kind of an impact crater a large meteorite would form at the bottom of a shallow lagoon. Possibly that would account for the differences between the Carolina Bays and the other impact craters we know. And possibly a high velocity impact at a very shallow angle will form elliptical craters.

In short, the Carolina Bays still present several riddles which may have to wait for an entirely new piece of information for their solution.

And finally: a fossil meteorite crater. There is a large quarry about two miles east of Kentland, Newton County, Indiana. The strata are normally flat there. But at one point they are, as one investigator put it, "intensely deranged." That a large and violent explosion took place there in the geologic past is accepted by all observers. A few years

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ago Robert S. Dietz, who examined the evidence, made the suggestion that the "explosion" was a meteorite impact. No other possible cause could be found. The suggestion is probably correct and as of 1951 the United States is the only country with a fossil meteorite crater, as it was for decades the only country with a meteorite crater.

But considering what happened in the case of recent meteorite craters. I wonder how soon other fossil meteorite craters will turn up.

THE END

THE ANALYTICAL LABORATORY

This September issue is the 250th issue of Astounding—so Reader George Publos tells us—and in any case. Astounding attained its majority in January. Twenty-one years end this December, since the original "Astounding Stories of Super-Science" appeared in January, 1930. It was a Clayton magazine then; a few issues under Clayton were bi-monthly; a few months at the end of the Great Depression depressed Clayton Publishing Co., and therefore Astounding, to zero. Since Street & Smith took it over in October, 1933, there have been twelve issues every year, and next month's issue makes eighteen years of that.

The first two hundred fifty issues has shown about as much shift and change of character as the average human being does in going through the first twenty-one years of life. Basically, 1930-models were adventure in strange places; the stories were about individuals with individual problems. In the 1940 models, the stories were oriented much more toward individuals trying to solve problems of wider scope. The 1950 models—well, Astounding has long been annoying to professional, commercial authors. There is no formula, no understandable, predictable pattern. They find it somewhat difficult to grasp the point that the authors and readers, not the editor, determine what science-fiction is and should be. Heinlein, Asimov, de Camp, van Vogt appeared, and reshaped our understanding of science-fiction. Shiras, and Schmitz and Poul Anderson are adding new items and new approaches. Russell and Williamson and the other long-timers continue to shape and mold the material, and explore still other aspects.

Actually, Astounding Science-Fiction has all the formula and pattern of a good bull-session. Or rather, a new direction and a new pattern every time one of the authors, or one of the readers, in a letter, suggests a new slant.

The only formula I can find in the past score of years, as a matter of fact, is the basic one, "If you're looking for your old, familiar kind of materials—try the back issue department!"

With which somewhat longer-range Analytical Lab, let's proceed to the report on the June, 1951 issue.

Place	Story	Author	Points
1.	. . . And Then There Were None	Eric Frank Russell	1.51
2.	Breeds There A Man	Isaac Asimov	1.94
3.	Crisis	Edward Grendon	3.13
4.	The Mauki Chant	J. A. Meyer	3.56
5.	Bait	Roy L. Clough, Jr.	4.02

". . . And Then There Were None", by the way, received an exceptional number of letters of strong praise. I liked it myself!

The Editor.

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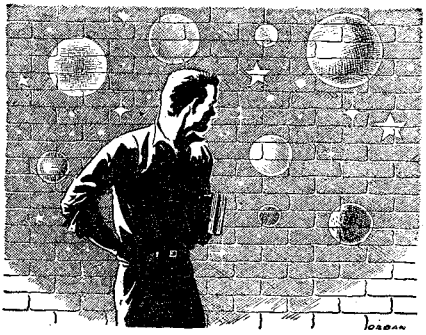
BRICK WALL

BY J. A. MEYER



***There are** several ways to get past a brick wall. When it walls off all space, you can't go around it, or over it, or under it. But you can start taking it apart, brick by brick. . . .*

AD ASTRA the plaque read. Jay paused, scrutinizing the bas relief of the spaceship while his hands deftly slid the book out from under his coat and into his brief case. He wiped the sweat off his forehead, and took the slow conveyer past the big wall photos of the Martian desert, and the Lunar craters, and the spaceship yards in the Rings, and then the big oil painting of the crash of the famous *Texas II*. AD ASTRA.

Space was the new universe for technologists, the frontier, big risks, hard life, high pay, the sky was just the start—vacuum engineering, servo mining, zero pressure smelting and reduction, no-temperature metallurgy, ten-meter electron "tubes," orbikinetics—

Terra was malaria and quinine and oily Amazon swamps, coal pits of Antarctica and frostbite and snow blindness, or dysentery and roasted brains and pitchblende mines of Africa — laws and franchises and finances, and political hamstringing, and crippling engineering precedent —pre-space school, four years of tedious classes, study halls, exams, authority, irrefutable precedent, stealth, trickery, and a hunger for books, and—

Jay felt the weight of the brief case pulling on his arm, shifted it over to his right hand for a minute. There was something about those photos, and the uniformed cadets, and the whole pre-space school, an ideology. He shook his tired left arm, stepped off the conveyer and stopped in front of a polished marbloid panel to check his uniform.

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He shut his eyes for a moment and listened.

Space, the walls whispered through the forty stories of the school. Space, the hurrying feet of the students pounded on the marbloid floors in measured thuds, the grinding of the rolling sidewalks, the shudder of the spiral lifts echoed. Space, mumbled the scratchings of a hundred pencils in the huge library, the tense hundredfold rasp of breathing, the sporadic crumpling of paper, the contagious spread of coughing across the reading room. Space, out to Space, out—

Jay blinked, glanced at the reflection in the marbloid panel, felt his cropped blond hair prickle. It *might* have been coincidence—but he was almost a hundred yards from the library exit. He took the slow shuttle to the escalator, fighting the panic, managed a guarded backward look.

Onto the escalator, and the girl cadet got on behind him. She got off at the tenth floor, followed him into a small cafeteria. A tall girl, almost as tall as he was, with dark hair, and a straight nose. She pushed a tray behind him past the food slots, followed him across the room to a table and sat down opposite him.

"I like to eat alone," he said flatly. The girl looked at him, puzzled. Cat's eyes, watching him.

"That was a research book you took. Those aren't supposed to go out." Jay could feel his insides tighten. He stirred his coffee silently, studying the girl. The checker at the library had methodically searched his brief case when he left, but apparently the girl had spotted him sliding the book under his coat.

"How do you know?"

"I saw you get it off the shelf, and I needed it to research a term report. I thought you'd put it back in time for me to use, but you just walked out with it—"

"So? That rule about research books is stupid anyway."

"But that's no reason to steal books. What are the rest of us supposed to do?"

"Wait till I give it back." Jay went back to stirring his coffee.

"I could call the monitors."

"Over a book? Don't be stupid," Jay said. "Look, eat your meal, and if you're still so curious, I might tell you why I took it."

"But—"

"Eat," he said. The girl's mouth opened as if she were going to say something, then closed slowly. She picked at the food, not eating much, and then lit a cigarette and watched while he ate.

"You're wondering why it is that I have to steal a ten-year-old research book from a school library—" Jay said finally. The girl nodded. "Because I'm a mathematician, an electronics specialist." The girl's eyes widened in surprise.

"How did you—"

"Get into the psych wing of the central library? It wasn't easy. I had to wait till the librarian went to lunch. That gave me about forty

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seconds to get down the corridor and under the electric eye beam, before the sub showed up. I had it pretty well timed all week, and I just waited till I had a chance. That's stupid, isn't it? Having to sneak into a library section because I'm supposed to specialize in my curriculum, and don't have the right kind of a library card."

"But that's the co-ordination policy—"

"I know, 'Specialization eliminates overlap' . . . *Gliechshaltung.* We have the same propaganda all over the electronics wing—specialize, specialize; it's our war chant. So I'm supposed to come out of prespace school a walking relay computer. Oh, well—"

"What did you want the psych book for?" The cramped feeling in his stomach began to ease up.

"That process exam we have to take to qualify for Space— I wanted to find out about the psychological part of it, and make sure I can pass it."

The girl's laughter rang off the marbloid walls till everyone in the cafeteria was looking at them.

"Hey, cut it out," he told her.

She buried her face in her hands, shook with a kind of tense humorless laughter for a few minutes, till he felt his face burn, and the girl was smirking at him through her fingers.

"That would be an electronicist *passing* a psychological test. I suppose you intend to study for it."

"All right, all right, if it's so funny—what's wrong with that?"

"You can't *pass* a psychological test—you just take them, and get placed. There's nothing you can do about it."

"That's what you think."

Her name was Lee, he found out, and she was a senior in pre-space, majoring in group relations, and minoring in social tensions, all of which made no sense to him. They took a walk after he ate, talking about that big process exam, stopped at the sidewalk shuttle terminal where they could watch the uniformed students walk by, in step.

"Robots."

"That type usually does pretty well in Space," Lee told him.

"Them? But they're too *dumb* to get into Space," Jay protested.

They argued for three hours about psychological tests, and intelligence and personality, and Rorschach, and Drive, and psychomotor abilities, and Weschler, and Stanford-Binet, and neurology, and—

"Psychology isn't something you can stuff into an electronics equation," the girl said. "It's complex—"

"It's disorganized," Jay argued. "If it was a real science, it would be related. It's just a hodgepodge—"

"Look," Lee said, "after one day, how much do you think you could know about psychology? I've been specializing in the field for four years, and I'm just beginning to find out what it's all about. I know these tests though, and there isn't any-

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thing you can *do* about them."

"That's what you say." The girl leafed through the book quickly, and pointed to something.

"Here's what they say about Space candidates — this is a Rorschach analysis of the personalities of some two hundred successful graduates—predominant A, and F, and pretty strong D."

"Which means—?"

"Which means, to quote, 'A solid, conforming, nontheoretical approach gives the best indication of success in a cram program like Space school.'"

"The clods, you mean," Jay said bitterly. "They aren't electronicists, they're blotters—memorize, memorize, specialize, specialize. They wouldn't know what to do with a new idea."

"What is it that's eating you?"

"This place," Jay said. "Every time you try to think up something . . . why just the other day I was trying to explain an idea I had on a communications switchboard to the instructor, and he told me to go look it up in the book. It isn't even *in* the book!"

"Nice aggressive reaction," Lee said. "Why do you stay in?"

"I want to go to Space." He looked at his watch, it was past suppertime. "We missed all our afternoon classes." Lee nodded, crushed out her cigarette. They started walking again.

"You're an odd character for an electronicist," she said. "I think you'd have done better to major in psych—the field is broader."

"For a career?" He shook his head.

"Don't you think psychologists go to Space? What do you think this big process exam is for? Too many of the technicians and idea men they sent out twenty years ago cracked up. So our job is adjusting the people to living in these tin cities they build out *there.*" She pointed to the sky. "After a few years we found out what personality types could take Space and the cities best."

"The peasants?"

"The unimaginative types did best. After all, worry and neurosis are mainly products of the imagination, and the really brilliant people out there generally cracked first from the strain and confinement. What good is a technician if he's in a panic and can't concentrate, and can't relax or sleep? We developed a theory of social outlet—interpersonal communication as a release for tension."

"People—" Jay said sneeringly.

"Social rejection and approval are critical factors in these Space cities, and no one gets out to Space now, unless the group he is going out with approves of him, and he has at least four or five good interpersonal contacts. And strangely enough, the high IQ's are very often introverts—"

"Blah, blah, blah. Doesn't make a bit of sense to me. You make it sound like they want sheep, instead of men." Lee lit another cigarette,

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paused at the spiral escalator to her tenth floor dorm.

"You're getting the idea."

"What about me, though? Do you think I can pass that process exam?"

Lee shrugged, stepped onto the conveyer, threw her cigarette away. "You haven't got a chance."

He ran into her again, not quite by accident. He'd read the psych book through, and was beginning to get a little familiarity with the terms, and he rationalized that he had a good reason for wanting to see her. He spotted her leaving the psych wing of the library after a week, and jumped off his conveyer, ran up a down spiral, past two startled monitors, hurdled two high-speed lanes, and got to an intersection of two inclined conveyers.

"Lee!" The girl stared past him, books under one arm, and rose out of sight.

"LEE!"

Off the conveyer in one jump, down the low-speed lane, and he swung himself onto a fast package conveyer, and rose three levels. He felt a sharp pain in his ankle as he jumped off, limped to the passenger spiral. Lee got off the spiral, and turned the other way. He caught up with her, grabbed her arm.

"Hey, what's the big idea, Lee?"

"I've got a class," she protested.

"You've got an explanation."

"Be a nice boy and forget you met me," Lee said quietly. "And don't worry about that process exam—"

"Listen, that's what I want the explanation on. What was the idea of that remark last week?"

"Oh . . . well, look, I have two classes in a row, but then I have the afternoon off. How about meeting me later when we can talk?"

"How do I know you'll show?"

"I'll be there," she said. "One o'clock."

"O.K.," he said, limping back to the escalator with her.

"What's wrong with you?"

He shrugged.

"Where do we meet? The Caf?" Lee nodded.

"That psych . . . that's all you want to see me about?"

"Yeah, sure," Jay said.

"It's one forty," Lee said. "What happened?" Jay shrugged, dumped his books on the table, and sat down opposite her.

"Nothing—"

"You look like your two best friends just died."

"Shut up!" he snapped. He propped his chin in his hands, and slumped in the chair, his face pale and dull looking. His eyes were shut for a while, and finally he opened them, licked his dry lips.

"Have a cigarette," Lee offered, holding one an inch from his mouth. He shook his head and she let it drop on the table. "Coffee?" He shook his head, swallowed.

"No. Let's talk about that psych."

Lee studied him, smoking. "Bad news from home? Someone died?"

"I don't want to talk about it," Jay said, his face going white again.

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He picked up the book, his hands shaking, and opened it to a dog-eared page. "Now, how about explaining these blots to me? What are they?" Lee took the book, lost the place, and started to flip pages looking for it. A letter dropped onto the table, and Jay reached for it quickly. Lee picked it up. It had a blue star on the front.

"A spacegram. I've never seen one before," she said. "Who do you know in Space?"

"Give that back," Jay said. Lee pulled it out of his reach, unfolded it. Jay made a grab across the table, then got up and came around after it. "Keep your nose out of there."

It was short, and she read it in a glance.

HAPPY BIRTHDAY FUZZY. ARE YOU STILL TRYING TO KID YOURSELF? WHY DON'T YOU GIVE UP? YOU'LL NEVER MAKE IT. WORST OF LUCK.

EARL.

Jay tore it out of her hands, jammed it into his pocket. "I told you to keep your nose out," he snapped.

"Don't raise your voice," Lee said. "And sit down."

"I'll sit when I'm ready to." He grabbed his books.

"Do you want me to call a monitor, and tell him about that book?" Lee threatened. Jay paused. "Well, sit down then, and we'll talk this over." Jay sat down finally, rubbed his eyes wearily. The talk of the other students was still a background rumble, apparently no one had noticed their argument.

"I'm sorry," he said.

"Who's Earl?" she asked. Jay winced.

"I don't want to talk about it."

"I think you might as well get it off your chest," Lee said. "Unless you want me to find out through Central."

"He's my half brother," Jay said. "And he's a louse."

"Why did he send you this spacegram?"

"Oh, it's a long story—"

"I'll listen," Lee said.

"Well . . . after my mother died—I was about five—my father married again, and Earl was my half brother. My father was an astrogator in the early Space Force, and he was always gone for two or three years at a time."

"Your stepmother?"

"We never got along too good. She was very sweet when my father was around, but when he was gone, she forgot I was alive. And that rat Earl"—Jay's hand clenched into a fist, and unclenched—"he was about eight years older than me, and he used to beat the daylights out of me, 'cause I was smarter than him." Jay snorted disgustedly. "I told my father when I was ten that I didn't like it, and he said, 'We'll see about it when I get back from this cruise, Jay.' It was his last cruise, when the *Texas II* went out to Ceres—"

"The crash—"

Jay nodded. "Yeah. You should have seen the old lady carry on—till she got the insurance. After that things were really lousy. And on

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top of it, that stupid lout Earl went to pre-space school, on the money that was supposed to pay for *my* education. My father would have squirmed in his grave. And the idiot graduated somehow, NCO in logistics, and he's out in Space now, working as a cargo juggler."

"You get along nicely with your family," Lee said. "But why did Earl send you this spacegram?"

"He used to call me fuzz-head because I was always thinking up new things that he couldn't understand. And he used to come home from pre-space school and strut around in his uniform and tell me I'd never get to Space. He was going through on *my* money—and he's been needling me ever since about getting to Space, him and my stepmother. So I showed them. I won a scholarship to pre-space, and I'm going to try for specialist-officer, and when I get commissioned, if *he* ever comes under my command—" Jay's eyes narrowed into slits of hate, and he made a cracking motion with his hands.

"What about afterwards?" Lee asked. "Suppose you do ride him out of Space. Then what?"

"Well, look," Jay said. "If I make officer, he'll probably transfer to keep out of my way. Just as long as he knows I'm top dog— Besides, I always wanted to go to Space anyway."

"He just made it a personal matter, right?"

Jay nodded.

"I suppose revenge is a fairly strong motive, but I hope you didn't tell any of the psychologists *that* when they asked you why you wanted to go to pre-space."

"No . . . listen, I have other reasons, too. I'd almost forgotten about that dope Earl until today, but remember, I want to be an electronicist, and I have to go to Space to get anywhere."

"Why?" Lee asked, lighting another cigarette.

"Because it's the only place they let you *do* anything. On Terra, everything is all set, planned. The only frontiers are in the Amazon basin, and Antarctica and a few other places—and they're drying up. But when I've got my Space bars, I can go anywhere. We haven't even begun the engineering on Mars and Venus, or in the Rings—that stuff will begin to pay some day and it's wide open. You really get a chance to *do* something."

Lee picked a tiny speck of tobacco off her tongue, breathed out a trickle of smoke. "What would you do, Jay, if you *didn't* pass the process exam?"

Jay scratched his head. "But that's why I want you to explain those psychological tests to me. I've *got* to pass it, Lee."

"You'll never learn, will you?" Lee asked, blowing a long cloud of cigarette smoke onto the table top, and staring at it vacantly till Jay brushed the haze pictures aside with a sweep of his hand.

"How about it, Lee?" She looked

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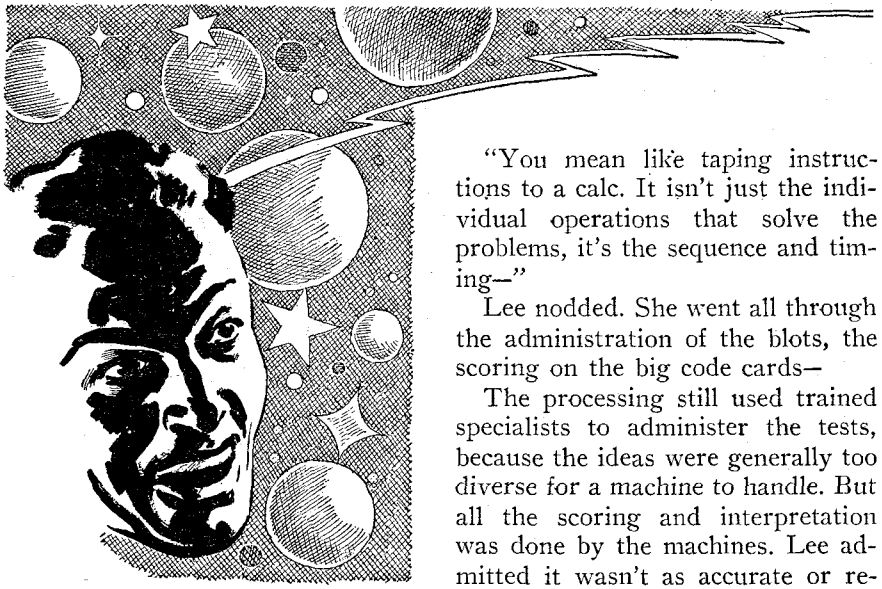

at him with black sullen eyes, her face still masklike.

"Is it *worth* it, Jay, living in a tin tank, and eating powdered food for ten years? Is it worth a nervous breakdown getting out of prespace—?"

"Yes!"

Lee shrugged, lit another cigarette.

Lee explained Rorschach blots to him, factor by factor, the locations, the determinants, the scoring, the relationships—

"It isn't what you see in the cards so much, it's in the way you handle the stimulus material. Like multiplication, it isn't the numbers, it's the process that interests us." Jay caught on.

"You mean like taping instructions to a calc. It isn't just the individual operations that solve the problems, it's the sequence and timing—"

Lee nodded. She went all through the administration of the blots, the scoring on the big code cards—

The processing still used trained specialists to administer the tests, because the ideas were generally too diverse for a machine to handle. But all the scoring and interpretation was done by the machines. Lee admitted it wasn't as accurate or revealing as a skilled interpreter could do, but it was much faster, and standardized of course."

"Well how come then that I can't pass it?"

"Because the machine is set to allow so much variation from arbitrary values in each of these scoring categories, and—"

Jay nodded. He knew about machine scoring, and cardex systems, so many conditions in so many variables— He had an idea of what the settings on the machine would be like.

"Something I don't catch, though," he said. "Just what do these tests measure? They certainly don't measure brain performance the way we check calc circuits."

"They *compare*," Lee said. "Couldn't you compare calculating

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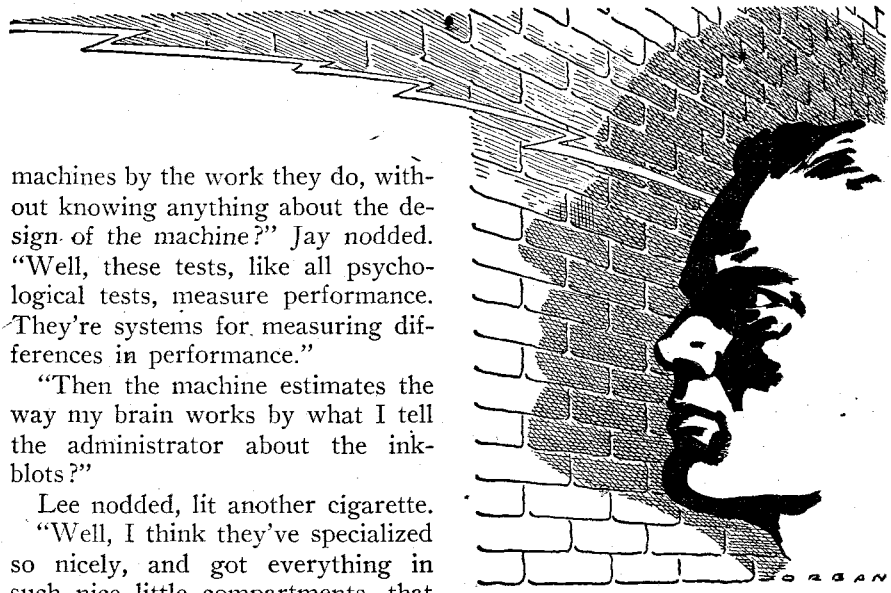

machines by the work they do, without knowing anything about the design of the machine?" Jay nodded. "Well, these tests, like all psychological tests, measure performance. They're systems for measuring differences in performance."

"Then the machine estimates the way my brain works by what I tell the administrator about the inkblots?"

Lee nodded, lit another cigarette. "Well, I think they've specialized so nicely, and got everything in such nice little compartments, that their tests are no good. And I bet I can beat them, Rorschach blots or not."

Lee blew a cloud of acrid smoke in his face angrily. "You and your paranoid stubbornness. Didn't I spend four hours just showing you how you can't *beat* these tests? This isn't a race—it's a measure of thinking performance, and everybody has a unique way of thinking."

"And you don't think they want *my* way of thinking?"

"No, I don't. Look, Jay, be a nice boy and give up this idea of going out to Space—the discipline is twice as rigid, the specialization is twice as intense and besides you wouldn't like it."

"Anything would be better than rusting away here. I'd live through it."

"You'd hate it, Jay. A person can't be creative and conformist at the same time. You're a nonconformist par excellence, an oddy, a dreamer—and you have too much curiosity and brains."

"How can I have too *much* curiosity?"

"Too much for the social pattern in the Space cities. These are the limits the Space school sets up arbitrarily, and you fit, or—" She gestured hopelessly. "Don't think about it, Jay, because you haven't got a ghost of a chance to get there." His mouth clamped into a hard, angry line as he listened to her, and he stretched his hands under the table.

"I'll beat that Rorschach and those computers yet," he told her. "I don't have all the details worked

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out, but I have the general idea—and I know it'll work."

"Don't, Jay, don't try it. You're just hitting your head against a brick wall."

"No, look Lee, I have it all figured out," he protested. "All I have to—" She kicked him sharply under the table.

"It's too crowded here," she whispered, and then loudly, "I have to get back to the dorm. It's almost supper." They picked up their books and walked out.

"You have to watch things like that," she warned. "You never know who the monitors are—" He nodded. "Look, Jay, if you think you really have something, I think my psych lab would be the place to talk it over. I fixed the lock, and I go there when I don't want to be bothered."

"Where is it?"

"On the twelfth floor. The whole floor will be dark, but it's the tenth door down on the right. Just push on the door, I'll turn on the light when you get in there. Is eight o'clock all right?"

"Yeah," he said. "I'm glad you thought of it."

He pushed the door open softly, and stepped into the darkness. There was a faint noise somewhere in the room, and he eased the door shut.

"Lee?" The fluorescent flickered on, and the girl came around the partition.

"It's all right," she said. "We just have to be careful."

Jay whistled softly. "You're telling me. I had to sneak out of my dorm down the laundry chute— I've done it before, but I nearly ran into one of the monitors coming down the hall. Had to duck into a doorway."

"Well, it's safe now—we can talk all we want." She sat on one of the lab tables, leaned back against the wall, lit a cigarette. "You think you can deceive this process exam?"

"I *know* I can beat these Rorschach blots, Lee. I've got it figured out perfectly."

"The absolutes of the engineering mind," Lee mused. Her black cat eyes narrowed on him. "How?"

"It's simple," Jay insisted. "Those computers are just machines, they aren't as smart as I am, and they have one very bad feature—they only work on the data that's given them. They can't evaluate. So I give them the wrong data, and get the right answer."

"Come down to my level," Lee said. "What are you talking about?"

"Look, they have specialists administer those tests, right? Well, specialists are mostly chowderheads, and they stick so close to the routine that the whole world looks like Rorschach responses to them. Now what they're going to mark down on the tests is what I tell them, right? So I give them the kind of answers that will get me into Space. I play stupid."

"Well, yes and no," Lee said.

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"I'm afraid you're still thinking in absolutes—"

"So does the machine think in absolutes, and so do the specialists. Look, I'm not saying I could beat this thing if it was really given right, I don't know— But the way they give them here, I can do it easily, because all the administrator pays attention to is what I say. If my answers are dumb, then I'm dumb, and that's that."

"You could do it with ordinary question-answer tests which don't examine thinking procedures, but these Rorschachs— No matter how conventional your answers are, you'll get them in your own unconventional way, and it will show—"

"Look," Jay said, "in a calc, it solves a problem by selecting the correct procedure from a library of 'memorized' procedures. It never creates new operations. Well, that's what these 'solid, conforming, unimaginative' characters do. They always compare the inkblot to something they've already seen, and generally something pretty conventional in their background. They give habit-responses. And that's the way I'll beat the Rorschach. I'll give them habit-responses — *somebody else's* habit-responses. I know I'll be trapped if I think—so I won't *think*. I'll just give them a taped solution. The machine will never know the difference."

"You're very confident about this," Lee said.

"Well, why not?" Jay asked. "After all, you can always cheat *one way* on these tests. You can always be *less* intelligent, and *less* imaginative, and *less* responsive. The tests are based on the assumption of an optimal performance, and you can always operate *below* optimum."

"It would take an engineer to think of something like that," Lee said. "You might even get away with it. But you're overlooking something very important."

"Hm-m-m?"

"Sociometrics."

"What's that?"

"Group relations, measured in terms of what other people think of you." She studied smoke patterns vacantly for a minute, then waved them away. "You might be able to fake your way through the rest of the test battery, but the sociogram is one thing you can't fool. The answers are out of your control."

"Is it important?" Jay asked.

It was. He found out quite a lot about sociograms during the next few hours, and about reputation, and a few other little things that he never thought would matter in a Space city.

Sociometrics were very simple—just a few questions for everybody to give his own preferences on.

Which of your associates would you like to work with most? Three choices.

Which of your associates would you like to live with most for two years? Four choices.

Who would you choose to carry out your work orders?

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It went on like that, careful deliberate questions, sampling group attitudes, likes, preferences, dislikes, favorite stereotypes— It could pick out cliques, leaders, outcasts, asocials, boycotts. No one could get into a group going to Space unless he was well known and liked by most of the group.

"We know that reputations aren't true reports of personality, but they are important in group living, and that's what this whole Space program breaks down to—an experiment in group living."

"Yeah, that's swell. So even if I do get by the other phases in this process testing, I still have to rely on the personal opinions of some dull adolescents."

"The critical factor in group relations is that you're being examined by other humans, not by low-level computing machines. Mental set during an examination won't help. If your group doesn't approve of you, you don't go." His mouth curled down bitterly.

"Yeah, swell."

"I told you," Lee said. "You'll just be hitting against a stone wall." He noticed her hands were shaking as she lit her cigarette.

"Well," Jay said, "I don't know yet. Maybe I won't go, but I'm not going to give up yet. I still think I can beat that exam, sociometrics or not."

"You're still handling it like an engineering problem. It's not—it's a matter of interpersonal relations."

"I have three months," Jay said. "I'll think of *something*."

"Why don't you grow up?" Lee asked.

"Hey, Lee!" He called to her as she went past on the up incline. She nodded, got off on the fifth floor. He caught up with her in a minute and they took a slow conveyer down the floor, away from the others. "I've got an idea," he said.

"Already? That's marvelous, it only took you a week to solve the whole problem of human relations. Congratulations."

"Oh look, Lee, it isn't *that* easy." Lee watched him expressionlessly. "You see, this whole question of group is just a matter of responses. Once you get the right 'set' toward people, you don't even have to think about it any more. It's even better most of the time if you don't. The trick is to get the right responses."

Lee nodded, the faintest trace of a smile shadow dancing on her mouth. "You found that all out in a week?"

"Yeah. So here's the idea. I've never cared too much about these other people in electronics, but now that they seem to be important, I've been studying them. There's nothing to it, actually. All you have to do is act *like* them, and they can't tell the difference. You just talk with them about the dull things they're interested in, and they eat it up. It's no trick at all to imitate them, and—"

"What happens to your own personality while you're doing this?"

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Lee asked. "Maybe you can kid yourself into a conformal pattern, and think you can stick there, but you can't fool me. You'll boil up like an oxy-bottle, and blow the lid off."

"Oh, I don't think so," Jay said. "I don't have to keep this dull surface all the time. Just when I'm around them, five or six hours a day. I figure it's worth it."

"Worth a nervous breakdown? Well, I wish you luck, but don't say I didn't warn you."

"It's kind of futile, Lee," he said wearily. "Sometimes I don't see how they can be so stupid. I swear I've *tried*. I can get along with them all right, but I can't *like* them. And they look at me like I'm some sort of double-acting relay tube. They don't understand my point of view, and I can't stomach theirs, and I—"

"Dear boy," Lee said, leaning back against the wall, and curling her legs under her on the lab table, "I have to admire your drive and ingenuity. You lasted three times as long as I thought you could. But now you have to admit that there isn't much you can do about people." She blew a long cloud of smoke at him.

"You're a psychologist, Lee—where have I gone wrong? What am I doing that I shouldn't?"

"You're learning," Lee said. "Maybe in a few years you'll know what it feels like to be really rejected. You've been too interested in *things* so far, and *things* don't avoid you. Now you're getting a taste of people, just a little, but think what it would be like if you went to Space, and got this for two years on end."

"But why, Lee?"

"Because you're too smart, Jay. It's the curse of our society that we have to fit into a rigid pattern to belong, and that pattern is a relay sequence in the tapes of a glass and wire moron-level computer. There's no room for imagination and creativity in our society, Jay, except in art and literature—dead ends."

"You know, Lee," he said, "you understand this sort of thing."

Lee's mouth flowed through a wan smile, her eyes focused emotionlessly on something a hundred years away. "I should," she said. "I've been through it."

"You?"

"The whole thing, three years ago. I suppose it's a part of this horror we call adolescence. After you once get past the retarded infantilism that the rest of these people are immersed in, you see how empty things are. Once you've grown up, there's no going back—you're alone from then on." She studied smoke patterns, shuddered, crushed out her cigarette. "Even if you do meet someone you could like, who's gone through the same thing, and would understand—" She threw the cigarette across the lab, slid off the table.

"Well don't you think it's about time you did something about it?" Jay asked.

"Dear boy—"

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"Dear boy someone else, Lee. I'm going to Space, and I know how I'm going to handle these sociometrics."

Her eyebrows raised slightly. "Really?"

"I'm going to trade my brains. I'm getting these associates of mine into the habit of using my brains, and it's a very comfortable habit. They like not-thinking, so they like me. These social relations operate on an input-output basis, like calcs. Right now I'm on the input side, but I'll get my output in a few months on that sociogram. It's cold-blooded, but it's a sure bet."

"You're still treating people like electronics experiments. What if you run into someone you can't fool, and the pushbuttons won't work?"

"I already have," he said, "and the pushbuttons *still* work."

"Who?" Lee asked.

"Guess."

"I'll kill that guy if I ever get my hands on him," Jay snapped, slapping the blue-starred letter on the table.

"Dear boy," Lee said, curling on the lab table, "sit down and relax. Think of something pleasant—you won't be angry half so long. Here"—she pulled on his arm—"have a cigarette." He brushed it away. "Oh really," she said, "you aren't afraid to smoke, are you?"

Jay clumped down in the seat, propped his head in his hands. "I don't know, Lee. I don't mean to act sore at you—it's just that stupid—"

Lee put her finger to his lips. "I know, Jay," she said. "You have to spill it off somewhere, and I'm the only person you can talk to." Jay nodded. "You see, your scheme to mingle with your little friends doesn't work so well in practice. You can *pretend* with them, but you can't trust them enough to confide in them."

"Don't chew me out, Lee, I'm not in the mood for it. That louse Earl just sent me another spacegram."

Lee blew smoke in his face. "Don't you see he's just trying to get you angry, so you *will* wash out? He's probably got a series of clever little insults to send you during the next month, just so you won't be able to study."

Jay's eyes opened in surprise. "Do you really think so, Lee?" he asked.

She nodded. "Of course. He's afraid you will make it, so he's doing everything he can to snarl you up. It's a basic insecurity in his personality. Now really, what you ought to do is just throw his spacegrams away without reading them—and tell him that's what you're doing. It would be the nicest revenge you could take on him."

"But how would I know what he said, if I threw them away?"

"Well, that's a sacrifice you have to make. After all, there's no sense doing something if you know it's going to hurt. You have to give up reading those letters if you want to get out of pre-space school."

"I couldn't do that," Jay said. "I can't get anywhere by ignoring him.

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I have to know what he says."

"But it doesn't *hurt* this way, Jay."

"I don't care," he said. "Some things are bound to hurt. I can't just go around looking for the easy way, and dodging everything that might be unpleasant—that's *chicken.*"

Lee studied her cigarette carefully, finally crushed it out. "You believe you can do *anything,* don't you?"

"I can try, at least—"

"Don't you realize that there are some things that you just can't change—that you have to adjust to?"

"Oh, you and your psych. If I listened to you, I'd be dead as a fish. I think you're letting that stuff go to your head, Lee. It's no good, Lee, it'll just mix you up inside."

"I know," she said.

"Well then, why do you worry about it if you know it's no good? You never get sore, or laugh, or do anything—you just mumble about 'complexes' and 'reactions' and 'mechanisms' and 'inadequacies,' and try to . . . I don't know *what* you're trying to do—"

"I'm trying to get rid of emotions," Lee said. "They bother me."

"But why—"

"Because the only emotion I know is *hate.* I hate my family, and all those idiots I go to class with, and the school, and the teachers, and I hate psychology, too. But it's all I have—"

"I'm sorry," Jay began.

"Don't be," Lee interrupted. "They all hate me too, just as much." She toyed with a cigarette, lowered her eyes. "Don't mind me," she apologized, her face smooth again, "I just unraveled a little at the edges. I'm all right now."

"Isn't there *anyone* you like, Lee? Anyone who likes you?"

"No, fortunately."

"But *I* like you, Lee," he said.

Lee lit the cigarette, studied the smoke pattern. "Oh, of course," she said. "Of course I have *you,* dear boy."

"Hey, introduce us, Jay." They crowded around Jay and Lee as he entered the dorm.

"This is Lee, men. She's my psyche."

"Your what?"

"Psyche." He let a whisper of smoke drift out with his words, picked a speck of tobacco off his tongue.

"Oh—"

Lee smiled at them with just the right trace of sophistication, shifted her posture studiedly.

"Well, these eager engineers all have to go to class," Jay explained, sadly, "so we'll say good-by to them."

"Hey, wait, stay a while. Talk to us. What are classes, we have them all the time. Come on, stay a while—"

They took a fast conveyer down to the end of the corridor, and the incline out of the dorm. There were still a few shrill whistles and yelps after they were out of sight.

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"Didn't I tell you?" Jay asked. "They could take a spiral up eight floors and see all the women they wanted to, but just because you go visit them, you get special attention."

"Such impetuous adolescents," Lee said.

"Yes, but you'll notice how nicely I have my sociogram stacked away. Five minutes of creative ordinariness like that, and I do more to build myself up with them than two months of helping them on their homework. I told you this ran on an input-output basis."

"I'll start suspecting you of schizoid tendencies if you keep splitting your personality like that."

"Look," Jay said, "one personality for them, one for myself. Every politician does it, every doctor, or psychiatrist. Maybe it is schizoid, or whatever you call it, but it works. Now how about that Rorschach record? Did you get the test histories?"

Lee tapped the book under her arm. "All set, one of the normalest normals you've ever seen. He'll bore you to tears."

"He'll get me into Space."

Lee's eyes studied him for a long time while the incline took them up to the twelfth floor. They slipped down the empty corridor, into the lab.

"I'm beginning to think you may get away with this," Lee admitted.

"Well naturally," Jay said.

"Only what are you going to do about your schizoid when you get there? You can't keep on manufacturing a personality—"

"I won't have to. As long as I'm going to be living with these people, I'll be a leader. Then I won't have to pretend so much."

"You really believe that, don't you?"

"Sure," Jay said. "Nothing to it, all you— Hey, what's the matter, Lee?" The girl shook her head, walked across the lab. "What is it, Lee? Did I say something—?"

"You're good at everything you try, aren't you?"

"Luck," he laughed. "I'd never have got anywhere on this process exam if I hadn't met you. Luck, and a little work—"

"Just suppose you don't get to Space . . . suppose you don't make it? What then?" Jay shrugged.

"I don't know, I'll do something . . . I can't just lay down and die over not passing a test. But I think I'll pass it anyway. What about you, Lee? Are you going to Space?"

"I'm afraid I haven't the proper schizoid personality," Lee said. "I couldn't lie to myself well enough."

"I bet you *could* do it, Lee. Easy." The girl didn't answer, just broke a cigarette in half, crushed it, then dropped it and ground it into the floor with her foot.

NEXT TEST WILL BEGIN the loudspeaker boomed. *Bzzzzzzz.* Three o'clock! Jay looked around him at the five hundred other people taking the mass test, then up at the screen where the blots were to

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be shown. Everyone looked as tired as he felt.

"People see all sorts of things in these ink-blot pictures; now tell me what you see, what it might be for you, what it makes you think of."

Jay listened blankly to the administrator, a balding young man who looked drugged from fatigue. The tests had been going on since eight in the morning, and Jay felt brain-picked, weak from guarding against slips. The sociogram, the IQ test, the Weschler, and all the huge array of subject tests, to see how well he knew his electronics and math, were all over with and he'd lied as skillfully as possible on everyone of them. He rubbed his eyes wearily, listened to the background noises of the room, the shuffling and scraping of feet, the scratching of pencils, the coughing, the breathing. The tension of the morning was gone, supplanted by exhaustion, and the weariness seemed to have settled over all the four thousand students in the test wing.

"This is card one." He pulled himself back sharply. The Rorschach was his last of the day, and he pulled his breath in and out carefully, remembering and wary.

Card I was flashed on the screen.

"It looks like ducks diving, and two dogs' faces, and in the center," he wrote, "it looks like—" Word for word, he wrote the carefully memorized "normal" report. Skip the proper number of lines, then write— He played it off the tapes flawlessly, a perfectly stereotyped and prepared

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solution to the problem. Maybe if he'd had to face someone, and "talk" his remarks, it would have been harder, but this way—

Machinelike, the administrator waited the proper number of seconds, then announced,

"Stop writing on card one. Proceed to card two." The screen dimmed, lit up again. "This is card two." Then came three, and four—and in the proper number of minutes the *performance proper* was over.

The *group inquiry* was just as dull and routine. "Draw a circle around the area of the card that you describe in your first response. Explain how you saw—" Over and over, the exact questions, and he had the exact answers ready. He circled the blot locations, numbered them according to formula, then checked to see that they matched his written responses.

He almost slipped in the *testing the limits*, caught himself, and cautiously erased, rewrote correctly, glanced at the administrator. It hadn't been noticed.

Most of the engineers looked confused by the test, but they scribbled their ideas down, followed instructions diligently. There had been a few "color shock" gasps to his left, that nobody else seemed to notice, but nothing much happened after that.

The test ended, and the clerks collected the sheets quickly, stacked them on the tables and started marking on the code cards, each one taking a single blot response, assembly-line style. They were very fast, very intense.

Facility, efficiency, stupidity. Walking robots doing a job because a tireless machine hadn't yet been built that could replace them. They were a quarter through the pile in fifteen minutes, so absorbed in their work they barely noticed him watching them. Punch, punch, punch, little holes in the score cards, expertly translating the responses into machine language. In the eyes and out the hands without going near the brain. Jay grinned.

That was that. He wiped the sweat off his forehead, stretched wearily, lit a cigarette.

It was all over but the waiting.

Lee wasn't waiting outside the exam hall as he'd expected, and she wasn't in her dorm. Jay searched the library, the restaurants, the traffic foci—

Finally he went to the twelfth floor to the lab. He tapped on the door, heard the answering click from the inside.

"Lee!"

"Come in, Jay."

The room was crowded with people, men, women, young, old, officers— They were all looking at him.

"I'll come back later," he suggested. A tall white-haired man about seventy came to meet him.

"We've been waiting for you," he said. "I'm Leighton Anson." Lee closed the door behind him.

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"What about?"

"It's all right, Jay. You're among friends," Anson said. Jay glanced around the room. Lee was out of sight. Anson started talking to the group—it dawned suddenly on Jay that they were talking about *him.* Anson told some of the things he'd done, showed them some score sheets on preliminary "free runs" he'd done on the Rorschach blots, and "tight runs," where he tried different emotional and intellectual sets. How had they found out about—?

Then he got a surprise, a jolt that rammed through his system like a two-hundred-twenty-volt sizzle. A *recording.* They'd had the lab wired, picked up every word he said.

Know I can beat this Rorschach test, Lee. I've—

So I give them the kind of answers—

Just give them a taped solution. The machine will never—

Can always operate below—

Jay squirmed. They had him now, dead to rights.

Don't understand my point of view, and I can't stomach—

Trade my brains—

Like not thinking, so they like me—

How could they know about the lab. Where did they find out?

I already have. And the pushbuttons still work.

Who?

Guess—

Jay felt the blood run out of his face, his skin prickle in little waves. It was like sitting in someone else's body, hearing this happen to somebody else—

They talked about him for almost an hour, sometimes running over his head with mystical sounding abstractions, but generally chewing over various test results. The door opened, closed behind him. Anson went over.

"I have his rating from the total process-testing, including his Rorschach—" Anson said. "I won't bother with the details immediately, just give you the conclusion. He was selected as an ideal grade B space school entrant." There was a silence that froze Jay's insides in a paralyzed ball.

"Gentlemen," Anson said, "we have a man who *beat* the calcs."

It was a nightmare from there on in. Questions, questions, arguments, rules. Why? Where? How? When? He saw Lee sitting white faced in the center of another group, answering questions in a tone he couldn't catch.

The administrator who had given him the Rorschach test was in for a while, nearly cracked under the questioning, kept insisting, "We scored his paper correctly. All we have to go by is what's down there. We taped it into the machine, what *more* could we do?" He swore up and down he didn't know how to score or interpret a Rorschach—all he did was translate into machine language. Finally Anson had him sent out, almost in tears, still in-

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sisting: "We taped it, what more could we do?" One thing puzzled Jay. If they knew about him all along—why had they waited?

"You knew the rules about that process exam. Why did you try to cheat?"

"I didn't know any rules," Jay said defensively. "And I was told I could give any answers I wanted on those tests. So I did."

"You knew you weren't the right material for space school. Why did you try to sneak in?"

"But I *am* the right material. That's why I tried to get in. Your *tests* are no good. They don't test accurately, and they select the wrong personnel. Look," he said, "all the *big* advances in science and technology have been made by *smart* people—not average people. Your policy puts a premium on mediocrity and dullness. So if there's any engineering going to be done in the space cities, and space industries—it will have to be done by remote control, by people on Terra who aren't allowed to go to space. "On and on, over and over, Jay listened and talked till he felt washed out, numb. His brain had smashed against that brick wall, and splattered in a million directions.

"I think this shows our testing procedures require investigation. We may have the wrong idea in this standardization," Anson said. "We see now that we can't keep our superior individuals who are determined to get in."

"No! I think we have to check the libraries closer, and see that these technologists don't get access to this testing literature."

Jay waited till they were arguing violently enough, got up, and eased out the door into the dark hall. He paused outside, lit a cigarette.

"Jay!" Lee slipped out the door, hurried down the hall after him, caught him by the arm.

"What *was* that? Who were those people?" he snapped.

"That was the general staff. All the top psychologists, sociologists, industrialists, and rocket experts in the Space Institute. Dr. Anson is the biggest psychologist in the country. You were seeing history in the making—"

Jay opened his eyes wearily, rubbed the sore eyeballs, yawned, rubbed his sore neck. "History be damned, why take it out on *me?*"

"Jay, Dr. Anson has been trying for ten years to get the policy revised, he needed something like your case to split the staff open, wake them up to the crudeness of the system. After all, when an engineer with three months of psych can upset ten years of planned testing—Listen, Jay!" He stepped onto the incline, Lee still hanging on his arm.

"Oh, don't you see, Jay, this is the only way to do it. Dr. Anson knows they've been putting the wrong people in those Space cities, the careful, unimaginative, low-drive people. The dreamers, the adventurers, the seekers, you and I, we're the ones who should go. And

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you showed that we'll find a way no matter what they do—don't you see, Jay, this was a chance for *me* too, for both of us, and all the others who belong out there on the new frontiers.

"Don't you see, Jay, it was best this way? All or none— You wouldn't have wanted it the other way, nobody you could really talk to . . . nobody really smart—"

His mouth drooped bitterly, wearily, his eyes kept blinking shut. He stepped off the incline on the eighth floor, threw away his cigarette. His legs were shaking. "I had it all figured," he said. "I beat that machine—I beat all those tests and sociograms, and everything—I had it all figured—but *you*—"

"Please, Jay, I'm trying to explain—"

"I trusted you, Lee; I thought you were the best friend I had—" He swallowed hard.

"It was too *important*, Jay. I knew it would hurt you, but it was too *big*. Don't you see, Jay, you may have knocked that brick wall down for the *rest of us!*" Lee's voice was high-pitched, wavering, her hands tightening on him as he tried to pull away. He tore his arm loose, shoved her away.

"*Listen* to me, Jay, *please*—"

"You sold me out," he said, "for a pot of psychology. Well, you can *have* it. Just get out of here." Her face went chalk white.

"JAY!"

He jammed his hands into his pockets, and walked down the long empty corridor, turned into the darkness.

THE END

OF WIDE INTEREST, NO DOUBT

The Atomic Energy Commission, following its policy of releasing for public use such patents as need no longer be held classified, has recently released U. S. Patent No. 2,549,899, issued April 24, 1951, to Sherman Fried and Norman R. Davidson. It will probably return the inventors little revenue, since the Government has free use of it, and so few others seem interested. It concerns a process for the industrial production of neptunium tetrafluoride by contacting neptunium dioxide with hydrogen fluoride in the presence of an oxidizing catalyst.

I can see certain difficulties in the commercial application of this process, however. Neptunium is the synthetic element prepared in atomic piles by neutron bombardment of uranium-238; it has a half-life of 12.5 days.

The Editor.

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BOOK REVIEWS

"The Blind Spot," by Austin Hall & Homer Eon Flint; Prime Press, Philadelphia; 1951; 293 pp.; $3.00.

Ardent collectors have waited two years for the emergence of this volume, and some readers with long memories have expressed impatience over the past *thirty* years that a hard cover version has not existed. Fewer and fewer science-fantasy books are being issued with illustrations, nowadays, but this one deserves—and gets—a half dozen by Hannes Bok. "The Blind Spot" treats, in luxuriantly glamorous, Merrittesque fashion of dimensional interstices, leading to a phantom world co-existent with our own, somewhat like the Kronwelt imagined by Raymond Jones — *vide* "Renaissance". The Hall-Flint classic is a highly philosophical work with forty-eight chapters such as "A Deal in Reality," "A New Element," "The House of Miracles," "The Man from Space," and "The Bar Senestro." If "The Moon Pool" is on your shelf, you will want "The Blind Spot" beside it. The publishers are preparing its sequel, "The Spot of Life."

Weaver Wright

———

"I, Robot," by Isaac Asimov. Gnome Press, Inc., New York. 1950. 253 pp. $2.50.

Any experienced machinist — or any owner of an old car — will assure you that machines have personality. That is made very clear in the nine stories which Isaac Asimov has selected from his saga of the positronic robots for the best of his three books to date.

The stories are told by seventy-five-year-old Susan Calvin, robopsychologist of U.S. Robots, whose own career has paralleled the rise of

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the robots from simple working machines to mastery of human society. As every reader must surely know, they play tantalizing variations on the inspired "Three Laws of Robotics"—rules as applicable to human society as to the machines. We meet such notable characters as Cutie, the robot who gets religion; Dave, driven to insanity; Herbie, the first — and last! — mind-reading robot; the Nestor, who "got lost"; and others, who lead inevitably to the "Evitable Conflict" of the final story, in which the Machines at last force mankind into conformity with its own Three Laws.

For puzzle situations, for humor, for warm character, for most of the values of plain good writing, "I, Robot" can be thoroughly recommended.

P. Schuyler Miller

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"The Toymaker," by Raymond F. Jones; Fantasy Publishing Co., Inc., Los Angeles; 1951; 287 pp.; $3.00.

Raymond F. Jones, who started out as "the poor man's van Vogt," has at last got the hard covers he so richly deserves. In this collection of six, five stories are from the pages of Astounding SCIENCE FICTION, and the final selection he called "the best I ever wrote" in 1948. The sampling is good, no tale being of too recent vintage to be fresh in the reader's mind, although it is unlikely that many have forgotten the Imaginos, those uncanny peace-guarding puppets who protect the galaxy in the lead story. Technologists go nuts in "The Model Shop" when a chronportation company makes a misshipment to our antiquarian age. In "The Deadly Host," Earth is menaced by mechanical parasites from the planet Sian—a real Sian's fiction story. Humor is the mood of "Utility," a tale of interplanetary trading. "Forecast" is the stormy saga of Weather Central; and "The Children's Room," the author's favorite, is a highly human document of mutants in the world today, and of a momentous decision affecting the future welfare of mankind. Jones' first volume is a joymaker. I tell you three times.

Forrest J. Ackerman

★ ★ ★

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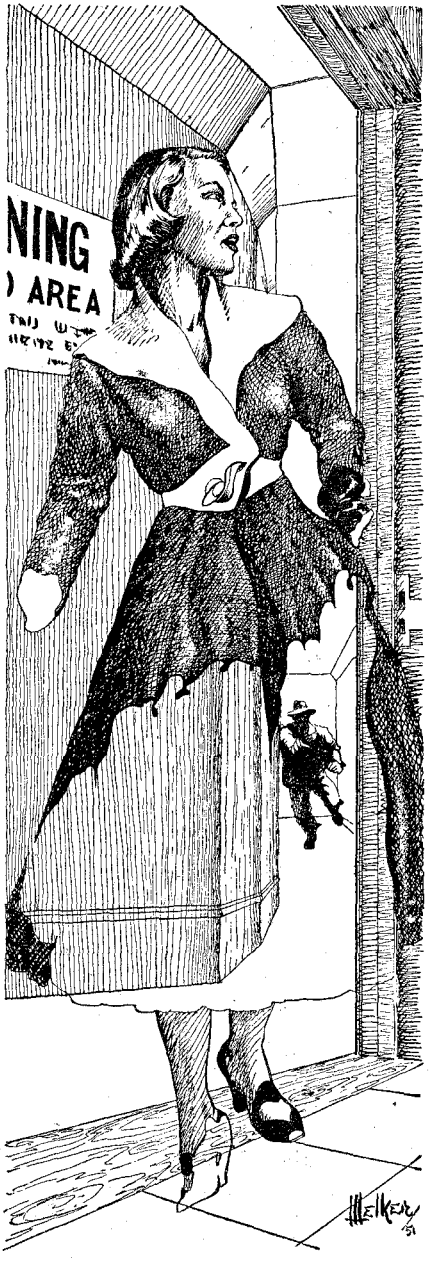

THE UNIVERSE BETWEEN

BY ALAN E. NOURSE

***The gadget** seemed a fine way to move things from Point A to Point B — but they didn't investigate what it was moving* through. *Until cities started being sliced off four feet above ground level —*

It was just past eight in the evening when the gleaming black '86 Oldsmobile shot down Seventh Avenue, glistening in the rain, careened around a corner into Eighteenth Street with tires screaming, and skidded to a stop before the tall white building. The motor was hardly dead when the driver slammed the door and bolted up the steps of the building, glancing up as he went at the "Institute of Physics" carved on the facade. He was a large man, tall and heavily built, his broad

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bland face tense, hair graying at the temples. A battered brown fedora was pulled down hard over his brow, the crown slightly mashed. The belt hung loosely as the raincoat swirled behind him.

The large man nodded quickly at the girl at the reception desk. "Glad you came so soon, Dr. McEvoy," she smiled. "Dr. Merry is storming. Up in 423 lab."

McEvoy nodded again. "It'd better be good," he growled. "It's pouring out. I nearly broke my neck." He pushed a button and stepped aboard the elevator. Merry was an unpredictable young whippersnapper, but he wasn't usually given to emergency calls during supper hour. McEvoy chaffed his hands as the elevator rose, his mind quickly flashing over Alec Merry's recent work. It would be just like the lad to turn up a Nobel Prize winner.

Lab 423 occupied a whole wing of the building, through two stories. One of the largest and best equipped labs in the Institute, it still carried the subtle but unmistakable appearance of slightly hurried untidiness so common to its kind. The ceiling was vaulted and white, set with arc lights. Near the center a young man was sitting at a desk, drumming the top with his fingers, his jet-black hair hopelessly knotted, sharp gray eyes watching the door impatiently. McEvoy pushed it shut carefully, his face flushed, and flipped the fedora expertly onto the hook by the door. "This had better be good," he growled, by way of greeting. "What's the trouble, Alec? You sounded all upset."

The black-haired man stood up, eyes bright. "Mac, the transmatter is working!"

McEvoy stopped short, his mouth half open. "Oh now, wait a minute," he snapped irritably. "Cut out the nonsense, Merry. I saw your latest report on *that* project this morning, and it seemed then that you didn't know for sure that the circuits could even be laid, much less get the thing working in ten more hours. What do you mean, it's working?"

Merry was almost speechless, shaking his head wordlessly. He pointed deliberately at the large bench in the center of the room. "That report was perfectly true," he said shakily. "The plans are theoretically perfect, and the computations check through without a hitch. On paper. But the wiring is only two thirds completed yet, and it works already! I swear it does!"

McEvoy stared at him in blank disbelief. Merry spread his hands helplessly. "Look, Mac, this has got me scared. I was working late on it, since I had finally a clear picture of just how one of the more intricate circuits had to go, and I wanted to finish it before I went home. Since several of the circuits are independent, I was testing them under power, using a portable ammeter. I was just trying to get it wired into place in the thing when—*it went. Whoosh.* No more ammeter!" He shrugged his shoulders eloquently,

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his eyes wide. "I went to look in the receiver, which is pretty nearly finished, and there it was. That ammeter moved a good twenty feet across the table."

McEvoy scowled, shaking his head. "This is silly," he growled. "What do you mean, it went *whoosh?* You had a grip on it, didn't you?"

"Of course I did! Then all of a sudden it wasn't there any more. I nearly fell through the floor."

McEvoy peered with experienced eyes at the small boxlike mass of wires and framework on the table. "Just where was your hand when you—lost the thing?"

Merry picked up a lead pencil, and reached into the box. "Watch," he said. He pushed his hand in farther, holding the pencil gingerly. Quite suddenly, without a sound or flicker, it was gone. McEvoy stared, blinking. Then he turned quickly to the receiver set at the other end of the table.

There, on the floor of the receiver, lay a lead pencil. The same lead pencil.

McEvoy picked it up, fingered it carefully. Suddenly he looked up, his face stormy under heavy sandy eyebrows. "Merry, what kind of a gag is this? I should break your head. This transmatter *can't* be working!"

Merry sighed. "You're telling me? Remember, I've been working on this thing. It can't be working, any more than an electromag can be working with no power!" He shrugged again, his boyish face puzzled. "But you put things in here, and they came out—*there!*"

As if to demonstrate, he picked up an alarm clock from the desk. Carefully he thrust it into the transmatter. It vanished from his grasp as if it had been snatched.

McEvoy, watching the receiver, saw it materialize there, quite as suddenly as it had gone. He picked it up, held it to his ear. It was ticking merrily. "How long does the transfer take?" he asked, setting the clock down on the table.

"Split second. Wasn't measurable with a hundredth-second chronometer. It shouldn't be, if it's short-wave dissolution and transmission. But the critical circuits aren't even wired in yet!"

McEvoy sat down, heavily. "Now, look, Alec. Your original work in conversion circuits has been good and sound. And the system for transmission of material molecules into short-waves, and subsequent resolution into molecules is quite valid, on paper. But obviously you can't do that without your wiring complete. Now think, Alec. *What's happening here?*"

Merry shook his head, and ran a hand through his hair. "I don't know. This transmatter should work, if it were completely wired. I think. But it wasn't scheduled for testing and experimenting for another three weeks. I don't understand what's going on here." He stopped short, and shot McEvoy an accusing glance. *"Mac, did you*

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change the clock?" he said tensely.

McEvoy looked sharply at the clock, "Of course not," he growled testily. He glanced at his watch, and then back at the clock again in sudden alarm. The clock looked all right, and it was certainly ticking loudly enough. But it was running backwards.

It stood there on the table, its tick sharply metallic in the silent room, but the minute hand had moved backwards ten minutes while they had been talking. McEvoy picked it up gingerly, examining it closely, shaking it. "I don't suppose we could be mistaken," he remarked flatly.

"I'm afraid not. I noticed the time when you took it from the receiver."

McEvoy tapped the face of the clock thoughtfully. "Merry, did you examine the ammeter that you passed through first?"

Merry was digging in the drawer before McEvoy had finished. He found the ammeter, walked over to the wall, and hooked it into a testing circuit. Snapping the switch, the two men watched the dial. The needle swung crazily for a moment, and suddenly fell dead as a curl of blue smoke rose from the instrument.

"Burnt out," muttered Merry. He pried it open with a small screwdriver, and examined the wiring closely. "Mac! This thing is all twisted around!"

"Backwards?" McEvoy snapped.

"Not—just backwards. It's twisted up all over. Completely shorted in two or three places, with a cross-short— Why, *nobody* could wire an ammeter this way!" He looked up in dismay.

McEvoy cursed. "This stinks," he said, finally. "This sort of thing burns me up. I don't like it at all." He stared blackly at the transmatter. "Things like this aren't supposed to happen in a physics research lab. Physical laws govern matter, and in this Institute we examine and predict on physical laws." He jammed his hands into his pockets savagely. "When something like this turns up, it makes me burn. Something like that 'Threshold' affair some years ago—do you remember that?"

Merry shook his head.

"Funny thing," said McEvoy. "They made us drop it completely. We were testing some low temperature apparatus down in 117 lab, when we ran across a sort of threshold to a four-dimensional universe. At least we thought that was what we had uncovered. Never could tell for sure, because six of our best technicians went loopey and died trying to investigate it. Really made a stink."

Merry looked up, frowning. "Seems to me . . . that was about fifteen years ago, wasn't it? Back around 1972? I was just in high school. Wasn't there a girl involved?"

McEvoy's face went sour. "There sure was. The investigation boiled down to a matter of psychological adjustment, so we dug up the most perfectly adjustable female alive to

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look it over for us." He spat disgustedly into the sink. "She did a great job. Developed cataleptic withdrawal as soon as she came out, and then before we got a chance at her, she vanished."

Merry looked up, startled. "Vanished?"

"That is what I said," McEvoy growled succinctly. "Vanished. Out of a closed room. We never saw her again, and the Big Boy put the clamps on that project like it was poison. Had the FBI on our doorstep over it." He picked up the burnt-out ammeter. "It was odd, though," he said. "When we dropped things into this little—four dimensional threshold — they came out reversed. Inside out. Backwards." He stared at the clock sourly. "Has Fritzer been working on this with you?" he asked.

Merry grinned. "Yes," he said. "That guy gets on my nerves, but there's no arguing with his logic."

McEvoy shrugged. "Fritzer gets on everybody's nerves," he said. "Let's give this thing a few more tries."

They went back to the transmatter. Moving the receiver to the far corner of the lab, they set the rheostats for the proper distance, and placed a small steel block in the transmitter chamber. It appeared in the receiver, quite unchanged. For over an hour they worked, transmitting a dozen small objects—pins, neckties, cigarettes. Finally McEvoy threw up his hands. "Merry," he scowled. "Is there any reason under the shining sun why this thing should be working this way?"

Alec Merry jammed his hands in his pockets. "There is not!" he sighed. "No reason at all, that I can see. But it does. Even if it does foul things up. The cigarettes went through without change. The key was completely reversed, and the light globe exploded as soon as it materialized. Something just isn't working in the receiver, apparently. Or in the transmitter. Or both. I don't know. But Mac, do you see what we have?" He looked up, his eyes bright. *"We have a working transmatter!* Do you realize what that means? Why, this is a prize-winner! This beats the rocketship project all hollow!"

"Yes." McEvoy nodded glumly. "And as it stands, this is less than worthless. At least the Moon-rocket is calculable. Put data on that into the calculator, and you get answers. I'd like to see the calculator figure this one out." He shook his head in despair. "Well, I'm going home to bed. You'd better do the same." He threw his coat over his shoulders, and started for the door. "Sleep tight, lad. You've got a few wrinkles to iron out in the morning."

"Pleasant dreams," said Merry wryly.

McEvoy had very pleasant dreams. He was feeling quite chipper next morning until he switched on the early telecast, and learned that during the night the entire city of San Francisco had silently and swiftly vanished into the sea.

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The telephone jangled as he watched the report on the telecast. He flipped the telephone table-switch. "McEvoy," he muttered, through his toast.

"This is Fritzer." The voice was metallic and unruffled through the phone. "Better get down here to the Institute, Mac. Pronto."

McEvoy scowled. "Why me?"

"Haven't you seen the telecast? The Federal men are down here already. They want to see the Executive Director of the Institute. That's you, buddy. Better step on it."

McEvoy gulped his coffee, watching the video screen. One thing seemed quite certain. It was not an earthquake, nor a bombing raid. The telecast account was excited and garbled, with occasional on-the-scene shots mixed in with several vague and even contradictory reports. The seismographs at Cal Tech had recorded nothing, but the city was gone—down almost to San Jose, and across the Golden Gate, both peninsulas had been sliced away, a segment almost forty miles long and five wide, leaving the suburban towns staring out on an incredible open bay. The break had been clean, perfect, as if the city had been sheared away with a monstrous knife, peeling the side of a building off clean, slicing a fire hydrant in half, and leaving a street in the residential section hanging over the water like a broken bridge. Of the missing city there was not one trace. It was as completely and incredibly gone as if it had been sliced off and carried to another world.

McEvoy mentally gritted his teeth as he entered the anteroom to his offices at the World Institute of Physics. The trip down from his Westchester home had been fast, and his nerves were grating already. Flash bulbs popped, and McEvoy's face reddened in anger. He motioned the government men into his office, slamming the door in a reporter's face.

"Now look here," McEvoy snapped. "Just because there's an earthquake on the west coast—"

"That was not an earthquake, Dr. McEvoy." The slick-looking man in the gray suit snapped his cigarette lighter shut and squinted coldly at the man's huge frame. "The geologists at Cal Tech, Fordham, and Cordingham Institute are agreed that whatever happened to San Francisco last night was not of natural origin. You are the director of all the projects in this Institute, and we quite naturally are looking to you for some information." The man in the gray suit shrugged and flicked his ash in a tray. "We think you may have lots of information," he added smoothly.

McEvoy spread his hands, exasperated. "What information? The Institute is running one major project—the Moon-rocket in Arizona—and a dozen smaller research jobs. But nothing here is remotely connected with—a city disappearing."

The Federal men scowled. "Be sensible, man," he snapped angrily. "A whole city gone, and a seismo-

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graph not twenty miles away *didn't even register a tremor!*" He snubbed his cigarette out angrily. "It's *got* to be something going on here. You have your thumb on every major development in physics all over the world—right in this building."

The questioning dragged on and on. McEvoy countered the questions briskly, decisively, angrily. Finally they left, quite unsatisfied, and McEvoy sank back wearily in his chair, trying to blank out the headache which was nibbling away behind his eyes.

The telephone, hardly quiet all morning, continued to ring, call after call. Finally, at ten minutes past noon, he snapped on the intercom in disgust. "That's all I want to take, today," he informed his secretary. "Refuse any more calls for me. I'm going out for lunch."

The secretary's voice came back to him, brittle through the speaker. "Dr. McEvoy, a woman has just come in to see you. She says it's important."

"Tell her to go hang," said McEvoy wearily. "I haven't anything to say." He snapped off the intercom, and reached for his hat.

She came through the door as he struggled into his coat, her eyes blazing, shaking off the angry secretary like a small fury as she came. McEvoy looked at her and blinked. She wasn't a large woman, rather smaller than average, he thought, with jet black hair cut short about her neck, her body slender under a trim coat. But her face—McEvoy blinked again. Such a vital face, such lively and expressive eyes. They were biting now, ice-gray, and her face was drawn into tense lines of determination. She walked over to him, fairly sputtering, looking him up and down, staring coldly but curiously at his face. With a little sigh of resignation he settled down again in his chair. "All right," he said. "What's the trouble?"

She didn't answer for a moment. Then her bright eyes narrowed, and her voice was clear and sharp. "You've been working on the Threshold again." It was a flat statement.

McEvoy shook his head almost automatically, starting to answer. Then he stopped, his mouth still open. "Try that one again," he said softly, his eyes wide.

"I said, you've been working on the Threshold again. Haven't you?"

His bland face was suddenly cautious. "What do you know about the Threshold project?"

"I know plenty about the Threshold project," she snapped, angrily. "I know more about the Threshold project than you ever got close to knowing. And you've been playing with it again—you must have been!"

Then, in a flash, he recognized her. Leaning forward over the desk, he scrutinized her face, his excitement rising. She was older, of course, more mature, but that nose, those eyes, the cut of that jaw—*"You're Gail Benedict, aren't you?"* he whispered.

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She looked at him, her eyes cutting. "I'm Gail Benedict. That's why I know you've been playing with the Threshold again."

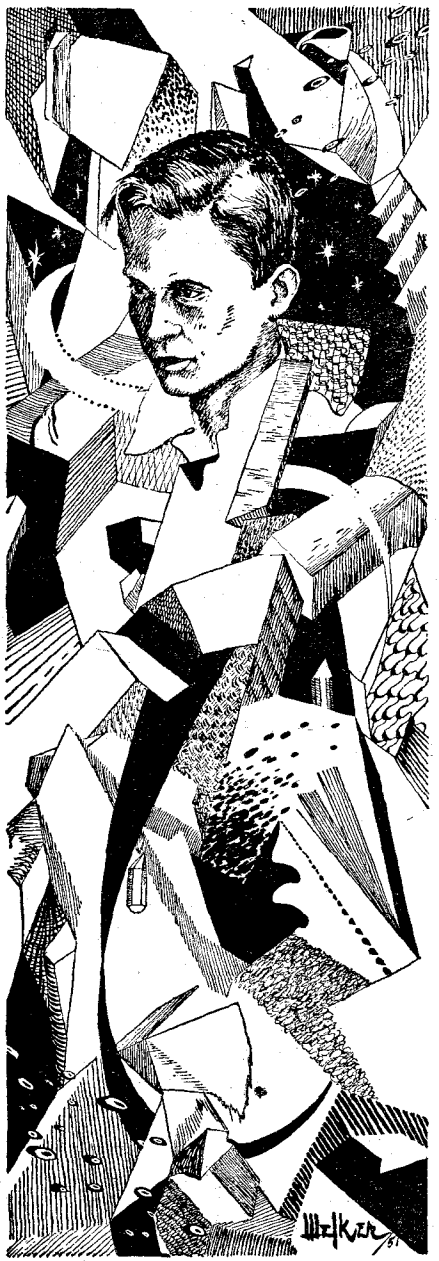
McEvoy stared at her, as if seeing a ghost. "You cut out of here clean—just disappeared, at the height of the investigation. You didn't leave a trace." He stood up, color rising in his face. "Have you any idea how much trouble you caused me? The Director clamped down as soon as he heard that you were gone, and the project was tossed on the trash heap. Then and there. Thanks to you, we haven't been able to go close to the Threshold project for over fifteen years." He sank back, shaking his head. "Why did you choose—to disappear?"

The woman shook her head impatiently. "Dr. McEvoy, that isn't important now. San Francisco vanished off the face of the earth last night. I flew down here as soon as I heard. I knew that you'd been working on the Threshold."

"Sorry, lady." McEvoy's voice was flat. "I haven't touched the Threshold since the day you vanished on us."

"Then you've been doing something else. This transmatter business. It might be that. How does it work?"

McEvoy stood up sharply, his eyes suspicious. "Look," he snarled, "I don't know how you've learned about the transmatter, but there's certainly no connection between that little gadget and the disappearance of the city of San Francisco, which



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seems to concern you so desperately." He pulled his coat closed with an air of finality. "I haven't time to talk to you now about the Threshold. This city business has me so tied up I don't know which way I'm going. Now will you please leave?" His voice was cold and final.

She stood straighter then, looking him squarely in the eye. "The only work the Institute might be doing which could cause a disaster like San Francisco is with the Threshold. If you haven't been working directly with the Threshold, then some phase of another project has crossed into it, somehow." Her voice was brittle. "You just don't know what you're dealing with, McEvoy. I have an inkling, at least, and something's got to be done. Whatever you're doing, I intend to find out." She turned on her heel, slamming the office door behind her as she left.

McEvoy swore, and flipped the intercom switch. "Get me Security!" he snapped.

As the woman started down the corridor, she noticed the two men who fell in some distance behind her. She quickened her pace toward the elevator. The men also accelerated, casually. One of them slipped into the elevator beside her, not looking at her, while the other paused outside the door to read a bulletin posted there. Gail pressed the button for the next lower floor. As the elevator stopped she slipped swiftly out the door, giving the down button a push as she went. The door slammed in the man's face, and shot downwards. She straightened her skirt, and was about to move on when she noticed another man standing casually by the stairwell.

In a panic she quickened her step down the corridor. The man sauntered slowly after her. Moving close to one wall, she tried a door, found it locked. She half ran to the next, as the man broke into a run after her. Finally the third door opened, and with a sigh of relief she slipped through—

Almost on her heels, the detective snatched the door open. Looked in on a small bare lab. Three men looked up from the bench at the far side of the room where they were working.

"What's wrong?" asked one.

"Where did that woman go?" The detective walked in, glancing quickly around the lab.

The three men looked at each other and shook their heads. "What woman?"

"She came in here just a second ago!" The room had only one door, and she plainly wasn't in the room.

"No, you have the wrong room. No one's opened the door all morning, except you."

The detective cursed. Turning, he jerked open the door to the corridor in disgust, and walked — into nothing.

Alexander Merry looked up from his desk, and his eyes widened in surprise. "Well!" he said. "Where did you come from?"

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Gail Benedict walked over to him slowly. "I . . . just walked in," she said mildly.

"Garbage!" said Merry. "Nobody 'just walks in' here. Especially today." He stared at her, scratching his head. "Where *did* you come from?"

The woman smiled disarmingly. "So I have slightly unorthodox ways of getting around. I've got to talk to you, Dr. Merry."

He rubbed his chin, felt with embarrassment the stubble from the shave he hadn't taken. His boyish face broke into a grin. "O.K., so you won't tell me. I've no objection to pleasant conversation, and all, but I *am* a little busy—"

Her voice wasn't smiling. "This isn't pleasant conversation. I tried to talk to that fat-headed director of yours and got the brush-off. I think you have the answer to the San Francisco disaster last night, and you just don't know it. I've got to find out."

Merry looked at her sharply. Then he scribbled something on a piece of paper, and dropped it in a dumb-waiter in the wall. "It's past noon," he said. "We'll have sandwiches and coffee in a minute."

She seemed very much on edge, glancing nervously around the huge lab. A buzzer sounded, and she jumped, then blushed. Merry removed the lunch from the dumb-waiter.

"Don't worry," he chuckled. "They won't bother us in here."

Her face went red. "I had to give them the slip downstairs in order to see you."

"All right. Now let's have it. What do I know about San Francisco—that I don't know I know?"

She accepted a light, and watched the glowing cigarette coal for a minute. "Dr. Merry," she said finally. "The . . . disaster . . . in San Francisco was not a natural disaster. I'm sure of it. I think you've been doing something here at the Institute that precipitated it, and I think the disaster was a premeditated and carefully calculated retaliation blow. I think that if we don't find out what it was and why, there'll be more 'disasters'. Worse ones. I think that last night was just a warning."

"Whoever you are," said Merry, "you do a lot of thinking. Go on."

She sipped her coffee in silence for a while. "What do you know about the Threshold?" she asked finally.

"Next to nothing. McEvoy mentioned it last night, briefly — something about a four-dimensional coexistent universe. And about some girl who disappeared—"

Gail flushed. "That was I."

Merry's eyebrows rose. "McEvoy didn't seem too pleased—"

She grinned briefly. "He was probably fit to be tied. I disappeared because I had to. I had to be sure that McEvoy's work on the project was cut off short."

"But that was fifteen years ago!"

"That's right. 1972. It was just an accident that they opened up a Threshold at all, and when they did,

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they couldn't investigate it. Their problem was really a matter of adjustment threshold, but the entrance to the other universe got to be known as the 'Threshold' so we let it go at that.

"It was a universe co-existent with ours, but in four linear dimensions, and almost totally incomprehensible by our standards. Its geometry seemed quite impossible, its space-time relationship completely hopeless—it was almost unapproachable, even for surface investigation. But it could be approached. They sent six good, normal men to investigate it, and lost every one. They couldn't adjust to it, and it killed them. Then they sent me, because I had a high adjustment threshold, and they thought I could take it. I could. Almost. But I couldn't take much, and I couldn't correlate anything that I saw there with anything on this side. But I did figure out one way that it *could* be investigated, and that involved cutting McEvoy out of the investigation cold. Apparently I succeeded."

Merry chuckled. "I guess you did. McEvoy was livid."

"But helpless. That was the important thing." Gail finished her coffee. "But to connect this up with the city trouble, something has happened somewhere to throw things terribly off—on the other side of the Threshold. I can't be sure yet, but it looks suspiciously as if the other side has just picked San Francisco up and dumped it somewhere. Maybe they twisted it clear out of our space, so that in our universe it just doesn't exist any more. Possibly it was just transferred to a different time-sector; perhaps it was moved, in bulk, to another area of our present space. It might not be hard for them. It might be the simplest of maneuvers. But it could be catastrophic for us."

Merry broke in, his voice puzzled. "But why? We haven't been working with the Threshold at all, as far as I know. The current project here is a transmatter, which involves nothing more complicated than hyper-wavicles, to my knowledge."

"What did you do with it last night?"

"I simply moved a few small objects a few feet. An ammeter, a clock, a pack of smokes—nothing large, and only twenty feet or so. How could that affect—?"

"I don't know." The woman snubbed her cigarette viciously. "I haven't the foggiest idea. But when Robert came back—"

"Who's Robert?"

Gail Benedict stood up suddenly. "Dr. Merry, I'm going to need your help, badly. Robert may be able to straighten things out, but he can't do it alone. We'll need information, and some good minds. Can you take a day or so to work with us? Something has got to be done, and fast."

"Where do we go?"

"Massachusetts. Near Springfield. I have a 'copter."

Merry finished his coffee in a gulp. "All right," he said. "But if I

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leave now, Ned McEvoy will have a stroke."

The woman's eyes snapped. "Let him," she said. "A stroke would do him good."

McEvoy clutched the black brief case tightly under his arm and marched into the University conference room, jaw set. The men around the table murmured greetings as he shook the rain from his gray Homburg and took his place. "I'm sorry I'm late, gentlemen," he said roughly. "The flight up here to Boston was rough because of the weather, and my chief assistant seems to have left for parts unknown, so I was delayed in New York." He opened the brief case briskly. "For the benefit of the government representatives here, I'll repeat what I said in New York yesterday: I have no information, nor any light to shed, on the San Francisco disaster. As soon as anything turns up that might be of interest, I'll contact Washington."

He removed a sheaf of blueprints from the brief case. "Now, then. These are the completed specifications on the ship that is under construction in Arizona. I would rather prefer not to circulate these for your inspection; they represent over eight months' work on the Mark XVII electronic calculator at MIT, and they are absolutely irreplaceable. They're in order for work here, and contain all the remaining specifications and calculations for the work on the ship."

One of the older men cleared his throat. "How long should it be, Dr. McEvoy, before the rocketship will be ready for testing?"

McEvoy took a deep breath and scowled. "The best of predictions would probably be wrong. The work progress depends on so many variables that no accurate statement can be made. But if the men keep up the good work they're doing, it should be finished in about eleven months. Before next Christmas, gentlemen, we should have a rocket to carry men to the Moon!"

Another man spoke up, his eyes cold. "I think we are all satisfied with your supervision of that project, Dr. McEvoy. But this city disaster can't be by-passed so lightly."

McEvoy ran a hand through his hair. "Aside from the rocket project the Institute has been interested in only one project of any size. The rocket occupies our most concentrated attention. But the other program could have no effect outside of the lab. I'd stake my reputation on it." He smiled tiredly. "As far as I'm concerned, the investigation of that catastrophe is quite out of my hands. My job at present is right there." He pointed to the brief case.

Three hours later he stepped from the building onto the street, tired and edgy. He felt vaguely uneasy, and wished that the flight back to New York were behind him. The contents of the brief case was heavy on his mind. A slight breeze stirred the trees along the avenue as he walked to the corner, and descended to a subway platform, mingled with

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the crowd. The subway was certainly the shortest and safest way to the airfield. A train marked "South Boston – Emmet Airstrip" rolled into the station, and McEvoy stepped aboard, sinking down in a seat with a sigh.

The train started down the tunnel. McEvoy's mind ran angrily back to the conference. It had been a trying afternoon. Smart businessmen, every one, they were worried about their part of the huge investment which made the rocket project possible. But they gave the Institute credit for about ninety per cent more technical and productive ability than it deserved. The fact that the World Institute of Physics had been building that illusion for years hardly occurred to McEvoy. Things went well, and the Institute got plenty of credit, but come trouble, however remote, the Institute was blamed. With a sigh of satisfaction he patted the brief case. There would be no hitch here, at any rate. This was the last holdup on the rocket project.

And Alec Merry! Where was he? McEvoy gritted his teeth. That lad was getting too smart for anyone's good these days, taking off without a moment's notice. McEvoy thought suddenly of the woman. Gail Benedict, after all these years! Maybe he shouldn't have been so rude. She might have had something to offer—

Quite suddenly the lights blinked out in the train. The hum of the motors buzzed to a stop, and the train slowed to a standstill. A dead, unearthly silence filled the tunnel. McEvoy cursed under his breath.

"What happened?" a voice cut in sharply.

"Turn on the lights!"

"Power must be off!"

A woman screamed. A horrible thought flashed through McEvoy's mind, and he clutched at the brief case under his arm. If someone were trying to steal—with a gulp he sprang from his seat in the blackness, tripping over someone's feet, his bull-like frame crashing into passengers standing in the center of the car. He reached the door of the car, found it closed tight. Running his fingers into the rubber crack, he heaved with all the power of his huge shoulders. The next station shouldn't be far ahead – the door gave suddenly, with a squeak, and he hopped lightly down onto the concrete runway alongside the tracks.

Pitch black! Not a flicker of light anywhere. The confused babble of frightened voices came clearly from the car. He pulled a pocket flashlight from his jacket, checked the brief case again. Power failure? Or *planned* failure? If those prints were to fall into the wrong hands— He started down the tunnel, sprinting in the direction the train had been moving. The sounds from the train faded behind him. Silence, except for the *plod-plod* of his own footsteps. He stopped short and listened.

Still silence. Nobody following. He might have been wrong. He

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started running again, faster than before. If the power went on, and the train started up again, he might be in trouble—

Somewhere ahead in the blackness he heard a scream. A man's hoarse whisper cut into it: "Shut up! Stop it!" McEvoy hurried his running, and spied daylight filtering down from a station platform. He reached it, and clambered up, the brief case still safe under his arm.

A group of people were huddled on a bench on the platform, a woman sobbing. McEvoy hardly noticed them. He started for the stairs. A woman half rose, stretching an arm toward him, eyes wide with horror. "Don't," she cried weakly. "Don't go up there—"

He ignored her, his heart pounding wildly. He took the steps three at a time, and stopped short at the top, staring out at the street—

The street was there, all right. The hack stands, the curbing, the fireplugs, the storm sewer openings—but the *city!*

The sidewalk was lined with bodies. Decapitated bodies. Blood was in the gutters, in a flowing stream. A small boy came down the street toward McEvoy, screaming hysterically—a little boy, just three feet tall.

But the city! McEvoy clutched weakly at his throat, gagging in horror. The city was gone. The buildings, the towers, the street lights, the people—sliced off smooth, as if by a giant knife. Four feet from the ground.

The transmatter was buzzing when he finally reached the lab, the power on. McEvoy flung the brief case down on the bench, ripped off his tie, and sank into a chair. Two technicians were working on the transmatter receiver, with bits of bright wire and small screwdrivers. One of them looked up when McEvoy entered, and walked over to the chair. "You look shot," he said. "What happened?"

McEvoy groaned. "They got Boston," he said. "It was rotten."

Fritzer frowned in alarm. "Got Boston? Like San Francisco?"

"Worse. Much worse! Better to have wiped it off the map—read the telecast. I don't even want to talk about it." He wiped his forehead with a handkerchief. "I had to walk through seven miles of pouring rain to get to the place my plane was. Couldn't even find a car available, and the streets were full . . . I was never so glad to get out of a place in my life." He glanced at the transmatter. "What are you doing here?"

"Still testing. Using a little more system now. Had the boys go through the building and pick up all the expendable junk they could find." He motioned to a pile of odds and ends on the bench. "We note down the condition before we send it through, send it through, and note down its condition afterwards. Trying to spot some order in the changes that come about."

"Any luck so far?"

"None at all. The alteration

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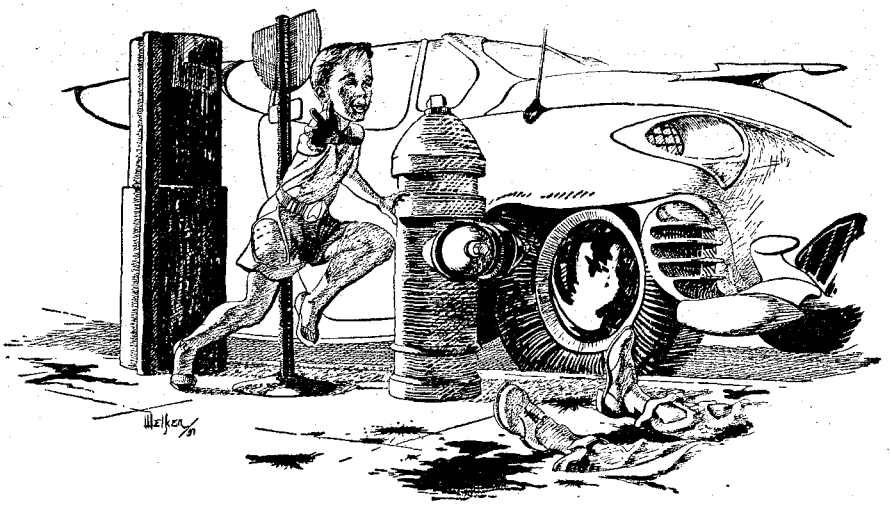

seems completely random. Sometimes the objects just don't return at all. We've been making some wiring changes, too, in hopes of finding the wrinkle that will make it work right. So far no soap."

McEvoy scowled. "What about Merry? Have you heard from him?"

"Yes. He called about an hour ago. He's up in Massachusetts, near Springfield. Thinks he's got a lead, and wants the transmatter stopped entirely. I wanted to check with you first. I can't see . . . well, what's the matter?"

McEvoy's face was white, his hand clenching the desk top like a vice. He spluttered and motioned feebly at the technician at the transmatter. "Stop that!" he choked. Like a cat he sprang from the desk, grabbing wildly at the man's hand.

He was too late. The black brief case slipped into the transmission chamber, and vanished in a twinkling.

McEvoy cursed, his eyes wide with shock. He shoved the technician aside and raced to the receiver. "You fool!" he choked. "You miserable fool!"

"But it was right with the other stuff—"

"If that brief case is wrong—" He stared into the receiver, stuck in his hand and groped around. "Fritzer! Get me an operator on the phone!"

Fritzer stared at him. "Take it out, man, take it out. See if it's all right—"

"I can't take it out," groaned McEvoy. "It just—isn't here."

Alexander Merry stretched his

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legs in the living room of the Massachusetts farmhouse and sighed, rumpling his black hair with his hand. "So this is where you have been working."

Gail Benedict came in from the kitchen with coffee on a tray. "Yes," she said. "It's out of the way, and a bit more primitive than we'd want, but it was reasonable in price, so we came here." She sat down across from him. "I'm so glad you came, Dr. Merry."

"Please," said Alec, grinning. "Let's be friends. Call me Alec."

"All right." She smiled back. "I came up here after I left the Institute so precipitately, because Dr. Bamford was in Springfield, and I wanted his help. I knew the answer to the Threshold investigation, and I wanted help in trying it. A year or so later Robert was born, and he became the first real investigator of the Threshold."

Merry's face fell. "Oh," he said flatly. "I didn't know you were married."

Gail flushed. "I'm not. It's a little hard for you to understand, I suppose. The Threshold problem became very important to me, when I had a taste of it. I knew I couldn't do anything about it alone. Dr. Bamford was deeply interested, from a psychological standpoint, and because I'd been working with him in adjustment threshold for years. We talked it out, and decided that if I just kept to myself out here, we could get away with artificial insemination. We did. There were no questions asked. As far as the neighbors are concerned, I'm a bereaved widow."

Merry scowled, and lit a cigarette. "But couldn't you have adopted?"

"Not so well. You see, what we wanted was a brand new baby. I couldn't adjust to the Threshold properly, because I had an analyzer full of data—all for *this* side. Survival data which did me quite well here, but had to be thrown completely aside before I could do anything with the other side of the Threshold. The 'throwing aside' technique was too much for me to handle. We had to have a brand-new analytical mind, *without any data for survival at all.* We wanted to raise a child, from scratch, taking it first on one side of the Threshold, then on the other. The only way we could do it with certainty was to start it off before birth. So as soon as I knew I was pregnant, I started crossing through. And the baby was born, and continued to be crossed through, regularly. And the process worked!"

Merry shook his head weakly. "This Robert must be quite a child!"

Gail smiled. "We were fortunate," she said. "Dr. Bamford can tell you more about him when he gets here, but Robert is about as bright a little boy as you'll ever see. He's no slouch."

"Where is he now?"

"Across the Threshold. He goes over there to play every day. Says

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he likes it more than here in the afternoon, things are so quiet there."

"But when will he come back?"

Gail shrugged. "Who knows? When he gets ready to, I guess. Among other things, Robert is a trifle independent. He comes and goes as he chooses."

A telephone jangled in the corner. Gail picked up the receiver. "It's for you," she said.

Merry took the phone. "This is Merry, Mac! Took you long enough to get back. I tried to call—"

The angry buzz of expletives carried clear across the room. Gail blushed. "Now wait a minute," Merry snapped. "Hold on, Mac, hold on. What's the trouble?"

"You," snarled McEvoy, "are a great assistant." His voice rang metallically in the receiver. "What are you doing in Massachusetts? Man, have you any idea what's happened? What are you doing up there?"

"I'm quite busy," Merry snapped coldly. "I'm on a lead to the San Francisco trouble, and I may have an answer."

"Well, now isn't that sweet!" snarled McEvoy. "Little boy detective runs off from home and leaves his Frankenstein in the laboratory for any Tom, Dick, or Harry to play with—"

Merry turned white. "What do you mean by that crack?"

"I mean this half-cooked transmatter of yours is running amok. It's going all haywire. One of the lab assistants was playing with it just now, and it snatched my brief case."

"What brief case?"

"The rocketship specifications, you blockhead! Eight months relay calculator time. The Nobel Prize winner, remember? The MIT machine had them calculated. I went up to get them. And then this wretched assistant popped the brief case into the transmatter before I could stop him—and it never came out!"

Merry groaned. "It must have!"

"Well, it didn't!"

Merry was silent for a moment. "The calculator," he said at length, weakly. "It must still have the equations, all the material. Can't it be run off again?"

"That would be fine," snapped McEvoy. "Except that two thirds of the calculator is gone. In Boston—"

"Boston!"

"You didn't hear? They had another San Francisco. Only worse. Five hours ago. This job was really neat—the whole city was sliced off." McEvoy's voice was tired, suddenly, infinitely weary. "No people left, except for a couple dozen lucky ones, Merry. No buildings left. Nothing alive in the city but cats and dogs—and little children."

Something had gone terribly wrong. Robert stood very still, listening almost hopelessly in the soundless blackness, trying to sense the difference that was there in that

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confusing jumble of impossibilities. He felt the *thump-thump* of his heart, and he tried to force his mind into the hard, tempered channels that had yielded the best results before. Something was very, very wrong.

Then he was moving downward—not walking, for his legs were part of the crazy patchwork that whirled about him in response to the mental impulse that allowed him to move, but rather, *floating* downward to another level. He strained with his mind to grasp an idea, an image of some sort, something on which he could stand, correlate. His body was split up more intricately than usual, separated in an odd fashion, and he was dimly aware of the portions revolving about the part of him that centered his consciousness. He was surrounded by concentric circles of his body, clearly ordered and perfect in their revolution, except that they turned corners. Not strange to Robert—the geometry made sense to his practiced young mind. The repetition of configurations, the eternal kaleidoscopic switch and counter-switch of impossible geometry, was not entirely random, but ordered in an insane circuitous pattern. Robert watched, listened, tried to crystallize the thought pattern, the *feeling* that had been dogging him ever since he had crossed through, the *feeling* that he had never before encountered in fourteen years of crossing the Threshold—

FEAR!

It swept through him like an icy draft, sending chills through his mind, freezing his senses. Fear! Where did it come from? He turned quickly about, trying frantically to spot the source. Cold, unmistakable, it cut into his brain like an icy knife. Not his fear. THEIR FEAR!

The Thresholders were desperately afraid!

He knew that they were all around him—aberrations in the geometric pattern. Robert moved in the direction of their city. The fear was powerful now, driving through him in waves, almost like a tight directed beam. They were trying to tell him that they were afraid. In mortal terror—of something. He puzzled. They had expressed almost-human emotions before, on occasion: joy, elation, disapproval, even disciplinary impulses of depression and desolation, but he had never before found *fear* here. Never this desperate bleakness, this almost overpowering force of horrible fear—

The impact was staggering, and came to him now mixed with another feeling, almost of threat. They were afraid, and he felt his own fear begin to grow, an overbearing dread of impending danger, disaster. He sent out his mind, probing, trying to gather thought impulses, some comprehensible, *correlative* pattern from the rage of emotional power running through his mind. But his fear increased, *his own fear,* and the feeling of desolation. They were trying, almost frantically, to drive through to clear contact with his mind, but he felt the barrier that stopped them,

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that had *always* stopped them. Suddenly he wanted to return across the Threshold, to talk to Gail, to ask her what to do. He felt the helplessness of his fourteen years, longed for Gail's cool gray eyes and careful way of making things clearer to him. He was suddenly deathly afraid, and tried to move back the way he had come, to the area through which he could cross. Something was wrong, horribly wrong, and he wanted fearfully to cross back. He started, and stopped short, his mind screaming in fear—

He couldn't move!

The fear warped through his brain like acid. A physical force was holding him, blocking him. They didn't want him to go! He felt pulsing through his mind the urgent need to try once again for an ordered exchange of idea or thought, even as abortive as all the other attempts, but he was too frightened. He struggled, trying to move away in the right direction, and he could feel the almost material tugging at his body, at his mind. He couldn't break away.

Then a new pattern joined the crazy patchwork of his body, cold to his senses, smooth, metallic. He couldn't tell what it was as it whirled through the black space, but he could feel some relief from the pressure of fear, an almost warm, easy feeling. His mind urged him to go, to return to Gail, but the strange object stayed with him. Bringing his mind into a tight beam of purpose he wrenched away, moving swiftly, powerfully away, back to the crossing-area, to the familiar patternwork that marked his exit place. He reached it, almost exhausted, and turned through the proper angle—

And found the warm sunlight of the other side shining down on his perspiring face. He crossed onto the lawn of the house, up the walk, and through the French doors. Not until he had scuffed off his slippers and closed his eyes for a moment to accustom them to the bright light did he notice that his hands were holding a shiny gray box.

"What is it?" Gail Benedict took the box from the boy, turning it over in her hands. "Where did you get it?"

Robert shrugged his small shoulders. "They gave it to me," he said. "They didn't want me to go. They tried to keep me there, and they gave me—that." He pointed to the box.

Alec Merry sat forward in his chair and took it from Gail. It was quite square, with beveled edges and four shiny studs on one side. Merry turned it over in his hand, shook it, holding it to his ear. "Beats me," he muttered. "It seems to be sealed at all the seams."

The thin, elderly man sitting across the room cleared his throat. "Let me see it, Dr. Merry," he said, his deep voice kindly.

Robert took the box and handed it to him. "What do you think, Dr. Bamford?" he asked.

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The elderly man weighed the box in his hand, examining it closely. His thin shoulders were stooped, and his once-dark hair was almost white. His face was wrinkled and kindly as he smiled at the fourteen-year-old lad. "Tell me now, Robert," he said, "just how was it different this time than it had been before? What happened?"

The boy shook his head helplessly. "They've tried to contact me before—you know that. I think they started that when I was about five, trying to make an impression come through. There's no real light there—the object-patterns give a sort of light, but it's not reflected light, and there's absolutely no sound that my ears can pick up. But I *have* had impressions, sometimes—*feelings,* I call them. Like you suddenly feel very happy about something, or you feel very bad because you've done something wrong. The only thing was that the feelings I had weren't *mine*. I knew all along that *I* wasn't feeling anything at all, but the feeling was being impressed into my mind. *Their* feelings. The Thresholders.

"But this time the feeling was fear. It's the first time I've ever felt that. They were afraid of me, or something to do with me." He looked up at the doctor, his large eyes fearful. "I had the feeling that if I didn't do what they wanted, they'd do something to me, and that made *me* afraid. I tried to come out, and they blocked me, paralyzed me, somehow. And then they gave me that box. I didn't know what they wanted."

Alec Merry turned to Dr. Bamford. "This boy has been crossing over into this—universe—for years now?"

The doctor smiled. "Yes. When your friend McEvoy and his staff failed with their investigation, they contacted Gail. She could cross the Threshold and remain sane, because she could adjust to it. But she couldn't correlate anything. She could maintain her sanity and observe anything she wanted to over there, but she couldn't come back and tell us what she'd seen. She had no ground for correlation. So she knew she could do nothing but antagonize McEvoy. It was a matter of adjustment techniques. But she learned two things there: she learned how to cross in and out of the Threshold without an artificial Threshold to cross, and she did find a way that the Threshold *could be examined.*"

The doctor smiled and gave Robert a friendly slap. "Robert has been crossing the Threshold since before he was born. He has literally grown up in two universes—this side, and that side. Psychologists would really have a field day trying to classify him—he probably has the most remarkable brain in the world!"

Merry shook his head, confused. "You mean the physical structure is different?"

Dr. Bamford shook his head quickly. "No, no. Not cellularly. A

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normal human being is equipped with a bilateral brain structure. Back in the Thirties they learned that a human body is controlled almost entirely from one side of the brain, except for optic and other sensory centers. All motor responses, all sympathetic controls, all memory storage is handled by just one side of a two-lobed bilateral brain. When sudden damage occurs to that side of the brain—say, traumatically—the individual is out of luck."

The doctor lit a cigarette thoughtfully. "But if the brain damage is insidious—cancer, for instance, or slow organic destruction of nerve tissue—the function of one portion of the brain can be transferred to the corresponding portion on the other side. Paraplegic victims can be taught to use the undamaged brain centers opposite the damaged ones. Bilateral transfer on a large scale. And they can be returned to normal."

He smiled at the boy, who was examining the gray box closely. "I've kept a close check on Robert, and have studied his brain development from infancy. He has no bilateral transfer, in the usual sense. He has no large inactive brain area, either. He has developed with two separate and distinct nervous systems, both central and autonomic, controlled by separate halves of his brain. One side for this universe, one for the other. *Two complete sets of survival data—*"

"What about correlation?" Merry scratched his head. "There must be some connection—"

Dr. Bamford smiled. "There is. Psychologists really haven't any terminology that fits Robert too well. They might call him hysterical dissociation, or even schizophrenic; really, strictly speaking, he's neither. He has two distinct, independently operating analytical minds, working on two exclusive sets of survival data—one for this side of the Threshold, one for the other. But he has what Gail doesn't have. Correlation circuits — connections between the two. One set of data is completely useless on the wrong side, but Robert can correlate one side, at least in part, *in terms of data from the other side.* He can remember. He can understand and explain the Threshold in terms that we can understand." Dr. Bamford grinned. "With a brain structure like that, Robert would give an auditor nightmares. But he handles it himself quite well. He's been clearing himself automatically since he was seven."

The doctor stretched, and lit another cigarette. "Robert can maintain himself—across the Threshold —quite well, just as comfortably as here. As far as the limitations of his human body allow, he can record for us everything his perceptics pick up on the other side. And he is completely free of the adjustment difficulty his mother has when she tried crossing. He just goes over there to play, compiling data as he goes along." The doctor paused and

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stared at the shiny gray box. "But this is the first time he's ever brought anything back."

It sat on the floor, its gray sides gleaming dully in the afternoon sunlight. "What are you supposed to do with it, Robert?"

The boy shook his head blankly. "I don't know. I couldn't tell what it was. It was just there, all of a sudden." He sat down beside it. "I had the oddest feeling—almost as if they were giving me a toy. As though I was supposed to play with it. They were afraid, and they threatened me, and frightened me, but they gave me—a toy. *To play with!*" He wrinkled his forehead and bent over the box, fingering the shiny studs on the side. "Maybe it makes music," he said. "Or maybe if I press one of these it will open up."

Merry shot his hand out to stop the boy, a shock of fear coursing through him. But he was too late. The boy had already pressed the first button on the side of the box.

And the whole west wall of the building crumbled gently into dust.

The four of them sat staring in disbelief. The wall had been there, just an instant before. Now tiny whirlwinds of dust rose from the heap of dry powder, and the breeze came through the gaping hole into the living room. The boy sat transfixed, his hand still on the top of the box, his face white, eyes wide with horror.

"What did you do?" Gail's voice was a hoarse whisper.

Robert sobbed. "I just pushed a button. Nothing more. Just this button." His eyes were streaming frightened tears. "It didn't even make a noise."

Merry was down on his knees, examining the box closely again. "Keep away from it," he muttered. "That's quite a toy you've got!" He rubbed the top gingerly with his finger. It was smooth as satin, and slightly warm. "Robert, didn't they *warn* you about it?"

"When they gave it to me? No. There was no warning at all. I had the feeling that they wanted to please me. To make me feel better. They seemed to know that I was scared."

Dr. Bamford walked to the hole in the wall and stooped to run his hands through the dust. "They must have been trying to tell you something, or show you something," he said. "But this!" He shook his head. "It doesn't make sense."

The boy wiped his eyes. "I've tried and tried to contact them before, but I never got anywhere. They never seemed to want to—bother."

Merry glanced sharply at the boy. "Never wanted to bother?" he said softly. "But this time they—*did* want to bother?"

"Yes. Always before when I got a feeling from them, it seemed I was on the outside, catching it all as it went past. This time they were directing it at me. Straight at me." He shivered, his small shoulders

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bent, and crossed his arms on his chest. "They've never acted that way before. I don't know what to think."

Merry looked at the disintegrated wall again, and back at the box. "For a toy, that gadget packs quite a wallop," he said wryly. "It was just luck that no one was standing in its way." He stood up and looked at the woman. "Gail," he said quietly, "I'd like to call Ned McEvoy up here."

Gail's eyes were cold. "I can't see where he'd be much help."

Merry rubbed his chin. "I know he's hard to get along with, and I know you dislike him. He may be an awful bonehead sometimes, but he knows his physics—inside out. Dr. Bamford knows psychology, and I have an acquaintance with semantics. Maybe the three of us could make some headway here."

She shrugged then, and pointed to the phone. "If you insist."

Robert watched from the corner of the room, with suspicious eyes. Merry grinned at Gail. "Don't worry," he said. "He won't eat you."

He dialed long distance, placed the call, and sat back to wait. "There's only one thing we've been doing that could have any effect on the other side of the Threshold," he said. "If the disaster in these two cities is really a retaliation blow from the other side of the Threshold, they must have a powerful motive. The way I figure it, the transmatter must be involved, though I can't see the connection. The first course of action is to turn off the transmatter. Then we try to determine what is going on. It may be hard on Robert, but we've got to spot it. We can't have cities disappearing. It just won't do."

The telephone jangled. Merry picked up the receiver. "McEvoy? This is Merry. Now listen to me, and shut up. I want you to do two things: first, shut off the transmatter, right now; second, fly up here. Use your own plane; I can direct you to a landing field on the place—"

McEvoy's outraged scream was audible clear across the room. "Over my dead body I'll turn it off," he bellowed. "That thing snatched a brief case worth forty million dollars, and I'm supposed to charge it to profit and loss. That machine stays on until I get those specifications back!"

Merry's voice was strained. "All right, leave Fritzer in charge of it, and get up here, and fast. Or it's liable to *be* over your dead body!"

Dr. Bamford and Alec Merry met McEvoy at the landing strip near the farm, and drove back in a battered old '72 LeSabre, along country roads. McEvoy looked weary, his sandy hair uncombed, three days' beard on his face. The flesh under his eyes was pouchy, and his bloodshot eyes bespoke sleepless nights. "Fritzer's working with the transmatter," he said heavily, "and he's been promised a broken neck if he turns it off without word from

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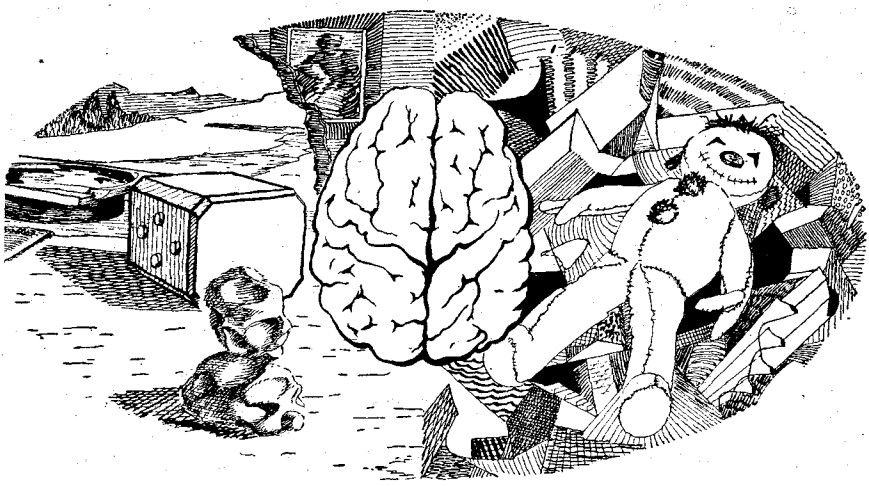

me." He sat back heavily, groaning at the bumps.

Merry scowled. "Mac, I tell you that machine's got to go off. There's a direct connection somewhere between the transmatter and these cities—I'm certain of it!"

"Well, let me tell you something," McEvoy snapped waspishly. "That transmatter stays on. The papers that disappeared into it were irreplaceable. The government alone has over forty millions invested in that rocketship, and the work simply cannot go on without the specifications. The thing would never get built, much less leave the ground. I've had the government breathing down my neck ever since 'Frisco played its tricks, and I have until tomorrow morning before I have to produce those specifications. If I don't have them by then, we're *really* going to be in trouble."

"But McEvoy! The cities! Don't you realize what's happened there?" Merry's voice was pleading. "Do you honestly think those disasters were *accidents?*"

"Well, what were they, then?"

Merry took a deep breath. "Good question," he muttered. "That's why you're here. We have a boy back here at the house who can answer a lot for us, I think. If he can't, I don't know who can."

"And that's another thing," growled McEvoy, running a hand through his hair. "I'd like to know why you're dragging me up here to listen to some kid air his troubles—"

"Don't be too hasty with the 'kid', Dr. McEvoy." Dr. Bamford's voice cut in reproachfully. "He'll throw you, if you don't watch out. Better treat him as civilly as you can. This 'kid' has a Stanford-Binet IQ of 193. He's just about as sharp a lad

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as you could round up in a hundred years. And if anyone can make a contact across the Threshold and get to the bottom of this mess, Robert is the one."

McEvoy settled back in his seat, his face sour. "He'd better produce in a hurry, whatever he does," he scowled, "or we'll be in prison before we turn around."

The car bumped up the rutted road, and down the drive to the Benedict house. McEvoy blinked at the missing wall, then turned to Merry in alarm. "What are you people doing out here? It looks like a cyclone struck!"

Merry shrugged helplessly. "You ain't see nothin' yet," he muttered.

Dr. Bamford explained about the gray box to McEvoy as Merry parked the car. Gail Benedict stood at the door. McEvoy clambered out of the car, his face set grimly.

"This had better be good," he growled.

Gail returned his glare. "Let's try to keep calm and friendly while you're here, Dr. McEvoy," she said icily. "I think it's about time we settle down and try to organize what information we have. You have some, and we have some. We might just as well smile at each other as snarl." She set the example by turning on a glowing smile, and taking Merry by the arm. "Come in and sit down," she said, cheerfully. "Robert's brought in another toy."

"Oh, no," groaned Merry. "He didn't go in again—?"

Gail glanced at him uneasily. "Yes, he did. He wanted to cross for a while when you were gone, and I let him. Don't you think it was wise?"

Merry shook his head unhappily, then grinned. "Well," he said, "he's back. With another toy."

Robert Benedict seemed indeed entranced. He was sitting on the floor with a small wad of gray modeling clay in his hands. He was molding a delicate head with it, forming the nose and eyes with careful fingers. He hardly glanced up when the men came into the room. Finishing the small bust, he held it up for the company to see. "This is good clay," he said. "See how smooth and soft it is? Now look." He squeezed a small hard pellet near the bottom of the figure, and tossed the mass nonchalantly to McEvoy. "Think fast," he said.

McEvoy caught it, and wrung his hands with a squeal of pain. He took the head carefully and examined it. "Why, this is hard as a rock!" he muttered.

"I'll go you one better," said the boy, impishly. "It looks to me like cast steel." He took it back, and pressed the pellet again. "Now look at it."

The chunk of gray stuff was as soft and pliable as putty. McEvoy pushed the nose of the figure into a deep dent with this thumbnail. Then he pressed the pellet at the bottom again, and felt the material suddenly and abruptly congeal in his fingers, warming slightly as it hardened. He stared at it closely, and

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his face reddened. "It *is* cast steel."

Robert looked at McEvoy closely for the first time, and a faint expression of distaste crossed his face. "Who's your friend?" he asked Merry. "Is that Dr. McEvoy?"

"That's right. Mac, meet Robert Benedict."

Robert's eyes filled with mischief. "I hear you're acquainted with my mother—"

McEvoy's face darkened dangerously. "Any word about the brief case yet?" Merry asked quickly. "I've told them about it here."

"Brief case!" Robert muttered to himself, suddenly turning away.

McEvoy shot him a black look. "Yes, a brief case! If it's got anything to do with your Threshold—"

Robert looked at him sharply. "Was the brief case you lost in the transmatter a black one?"

"Yes!" McEvoy's eyes widened. "You don't mean to say you—*found it?*"

"Black cowhide?"

"Yes!"

"With a brass double-lock catch on one side?"

McEvoy fairly sprang from his seat. "Yes, yes! That's it!"

The boy looked at McEvoy slyly, the faintest trace of a smile on his lips. "Well," he said deliberately, "I guess the one I saw was brown—"

"Robert!" Gail snapped angrily. "Behave yourself!"

The boy shrugged, unabashed. "All right," he said. "So I didn't see any brief case. But I did get that putty stuff, whatever it is. They gave it to me, and tried to keep me there again. They're still frightened, plenty frightened, and they tried to frighten me again, but I was onto them this time. They aren't going to hurt me. They're trying too hard to get something across to me. But why do they give me these things?"

Alec Merry looked dubiously at the gray box on the floor. "That," he said, "is a prize question. I think the answer would clear the air a good bit."

Dr. Bamford sighed. I guess it would. It might open a way to communicate with them. But what's the answer?"

"Maybe," said McEvoy acidly, "the child is playing tricks with you. He seems to have a red-hot sense of humor. Maybe that bright brain has a touch of imbecile to it." He glowered at the boy.

Robert stared back at him, blue eyes widening. "Gail," he said softly, "do you know what I think? I think your friend has hit the nail right on the head!"

They turned to him sharply, and the room was deathly still. "What do you mean?" asked Gail.

"These gadgets they gave me—and the way they tried to keep me back after they gave them to me. The way they've tried to communicate with me—" His voice rose excitedly. "I think those gadgets are just exactly what I 'felt' they were supposed to be!" he squeaked. *"Just toys—"*

"Now wait a minute!" said Alec

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Merry, disgustedly. "This box affair is mighty potent for a toy!"

Robert's eyes were bright. "You mean to say, it has some potent properties—on this side of the Threshold. Not necessarily over there. On the other side, according to *my* perceptics, the box was broken into half a dozen perfectly impossible pieces without any functional connection whatsoever. Remember, it was handed to me, and then I tried to cross back here, and from the force they were exerting to keep me there they weren't intending me to leave with the toy when they gave it to me. On that side, it might conceivably be a perfectly innocuous toy, just like the steel-clay is. The dangerous properties of the box weren't there until I brought it back here, and it formed something that it *wasn't supposed to be at all!* But it was a toy! They *told* me so, not in words, but in whatever sort of thought projection they used to contact me."

"But why?" broke in McEvoy. "If they're so all-fired disturbed about something over there, why give you playthings? It doesn't make sense."

The boy looked at him smugly. "It makes the best of sense. Under the circumstances, I think they were wise to give me toys, but very foolish in not *keeping me there* until they had the reaction they wanted. Think about it! They're in trouble—desperate trouble. And they know the trouble originates on this side. And then they think of *me,* wandering around without hindrance for a dozen years or so. Liaison! An ambassador, made to order for them! If they could somehow find a way to get their ideas across to me in symbols, they could tell me what was upsetting them so, and we could get them to stop this mayhem on our side of the Threshold."

"But why the toys?"

The boy smiled slyly. "Tell him, Dr. Bamford. I read it in one of your books. To whom do you give toys—in your laboratory?"

The doctor blinked, and his eyes widened suddenly. Then he was laughing, slapping his knee. "Robert! You're a prize! *Of course* these things are toys! I'd never have thought—"He wiped his eyes, grinning like a little boy. "In a psychology lab we run into lots of odd people," he said, still chuckling. "We get murderers, schizophrenics, persecution psychoses, or just plain feeble minds. In any case, we run into the same problem. The patient sometimes just won't talk, won't do anything but sit in a corner and blubber, or cringe with fear. Or he may be so violent that we have to stop him from screaming and scratching long enough to get his attention. Or he may be so idiotic that no word symbols we can use register with him." Dr. Bamford smiled. "The technique is very simple, in any case, and usually effective. We approach the feeble-minded patient—and we give him some candy. *Or a toy!"*

Gail blinked, her face white. She

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stared at the boy. "You mean Robert—" her voice trailed off.

Dr. Bamford chuckled, and pullled the boy onto his lap. "On this side," he said, "Robert is a very clever young man. Handles problems logically, and usually gets the right answers. Symbology is his meat—he walks right through math and semantics that stop me cold. Mentally, he's approaching genius level. But over there—"

He smiled at the boy sadly. "It looks as if over there Robert is nothing more nor less than a blabbering idiot."

The doctor lit a cigarette. "Without semantic integration into his universe to some degree, a child is helpless. He may actually be a bright child—sharp as tacks, lots of potential. But if he can't understand the semantic symbolism of the people around him, if words make no sense to him, if he can't connect the meanings of audio and visual symbols, his responses will be the responses of an idiot. Such conditions come about a number of ways—brain hemorrhage, brain injury late in life, birth trauma leaving scar tissue in the brain—a dozen different ways."

Dr. Bamford spread his hands. "Now take Robert. Across the Threshold he can observe the universe there, *limited only by his human framework and perception.* The physical universe around him there is only tolerable because one lobe of his brain is stored with survival data applicable only to that side of the Threshold. But Robert's brain cell-structure simply *can't handle their symbolism.* They do think, a form of thought-power, and undoubtedly they use symbols. But Robert hasn't the mental setup to understand their symbols; he can't begin to understand them. So his reactions seem imbecilic, to them. They couldn't make an impression on him, they got idiotic reactions to every semantic overture they made. So they didn't bother with him. He was doing no harm, coming and going all these years. If an imbecile is harmless, my bother him? They did try to 'cure' him several times, and made no progress at all. So they simply quit."

He stood up, smiling at the boy. "And now, they suddenly *have* to establish contact with him, somehow. Because this side of the Threshold has been doing something that threatens their survival, something so terrible that they're lashing back at us, wildly—and taking our cities."

McEvoy stood up, stretching his arms, watching the boy, who was settled complacently on the floor. "I can't see," he said, "much sense to messing around with the kid, then. If you *know* he can't do anything—"

"And what would you like to do with 'the kid'?" Robert snapped angrily. "Have him shot? You won't do so well crossing through there to look for your brief case, Dr. McEvoy. You ought to remember those things."

Ned McEvoy whirled on the boy,

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face red. "I didn't mean anything of the sort," he snarled. "What are you trying to do, anyway? You aren't getting anywhere with what you're doing. We just need a different approach."

The boy yawned rudely. "Oh, sure," he said indifferently. "Any old approach will do. You and your physical absolutes. Suppose you name one."

Gail frowned, successfully hiding a smile. "Robert, at least you can be civil."

Robert's face soured in distaste. "Yes, I suppose I should be civil," he said. "As a matter of fact, I've been thinking. There *is* another approach, so obvious I'm surprised that they haven't tried it."

Dr. Bamford turned in surprise. "But what approach? They can't contact you but vaguely. They can't *tell* you anything. How can they get through to you?"

"There's just one way," he said. "They can *show* me—"

He was uneasy when he crossed the Threshold.

Fourteen years of training—for a task he couldn't perform. But it *had* to be performed, and well. He knew, as soon as he had turned through the proper angle, that he was walking in a universe of danger. They were afraid—horribly afraid. Afraid to the point of desperate action.

Their fear struck him like an almost solid force. The pressure sledge-hammered his brain, driving deep into the marrow of his thoughts, probing, driving for a breakthrough, striving to circumvent the block of human flesh to contact him with ideas, insight. Insight was his only tool, the only hope of contact. They were desperate beyond expression now, to the depths of desperation.

With all the power of his mind he forced the thought pattern out—felt it thrust almost feebly into the blackness of nothing—hoping in the face of pure hopelessness that they could comprehend. "SHOW ME—YOU CAN'T *TELL* ME—*SHOW* ME WHAT IS WRONG!"

Fear surrounded him, biting into him, their terrible fear, and his own fear, welling up in his mind like a black phantom. He could see his body in its curious configuration of orderly disorder, whirling about him like sections of a patchwork quilt. Two concentric circles of different radii which interesected each other in three points. Twisting cubic masses interlacing into the jumbled incredibility of geometric nightmare. The blackness was about him, cold, coursing through him, and the fear and threat of terrible danger clung about him like a cloak. The hallucinatory sensation of being torn apart, roughly, in a jagged line from top to bottom, of seeing, unclearly, the parts of his body in mutilated distortion. And the motion—away, downward, though he knew that he was stationary. They were all about him, filling the nothingness with the power of their thought—incomprehensible thought.

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His mind was screaming to the nothingness: "SHOW ME!"

He moved. Down through the bottomless areaways of inky emptiness, dread seeping into his mind, growing, blooming into horrible fear. Suddenly he struggled, standing on the brink of impossibility, fighting not to move, fighting to stay, to go back. They held him, hurried him onward, with increasing speed. And quite suddenly they were no longer with him. Gone. And he stood writhing in the center of—*CATACLYSM!*

The universe was fantastically wrong—twisted, distorted all out of proportion to the ordered insanity that had been before. His mind reeled, helpless in the storm of roaring destruction. The circles were twisted, bent into squarish masses, distorted— His thoughts congealed in an awful realization — they had brought him here, and *here — his survival data was invalid.* Wrong answers meant sudden death, and here *every answer* was wrong! Something here was different, impossibly different. Suddenly there was light, brilliant flashes of green and purple, light where light had never been. His mind twisted in anguish at the brilliant glare, and he wanted to curl into a tiny ball, to cry out in torture. The very warp of space was wrenched into frightful wrongness. A screaming whine was in his ears, where no sound could be, driving upwards into ululations of agony; his body was caught in the cataclysmic stream of the warp, as irresistible power surged into his very marrow to wrench him apart from himself. His viscera twisted and knotted, hunger biting and slicing through his stomach, where hunger could never be. His body burned in terrible heat, and he knew that things—other things—were being twisted through him, turning him inside out in gargantuan vices—

CATACLYSM!

He screamed out, his brain reeling out of all control, and he heard himself scream—and suddenly, abruptly, he was out of the maelstrom, and *they* were around him again. Miraculously, his body was intact again. But he was filled with burning, paralyzing fear—

He had to get back. His control, so rapidly swept away and regained from the storm of destruction, was disintegrating. He struggled against them, trying to move himself back to the crossing place. Small splinters of blue joined the patchwork whirling about him, shaping themselves into the pattern of his body. With the last of his mental strength he struggled to grasp the blue splinters, to hold them to him, driven by a thought force that was not his own. Then he twisted himself through the angle of the Threshold—

And collapsed, panting, on the floor, with Gail and Dr. Bamford kneeling beside him. And in his hands, crumpled, twisted, were sheets of blue paper. Blue paper with white lines. Blueprint specifications. Robert sobbed in exhaus-

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tion, coughing weakly, and clutched them to his chest.

"Merry!" McEvoy's bellow reverberated through the house. "Let me get my hands on that brat and I'll break his skinny neck—" McEvoy's face was purple with rage, his huge hands clutching the frail blueprints with a savage grip.

Gail stepped from the bedroom door. "Will you be still?" she hissed. "Robert's trying to rest!"

McEvoy spluttered incoherently, and tried to thrust her aside. "Let me in there," he raged. "I'll thrash the nonsense out of him—"

She stood firm, her eyes blazing. "You can't go in, Dr. McEvoy. Robert's had a bad shock."

McEvoy snarled. "I want to see that kid," he said, his voice hoarse. "I want to find out what kind of garbage he's trying to hand me. He's done nothing but annoy me ever since I got here, but he's gone too far this time."

Gail frowned. "What's the trouble?" she asked.

McEvoy exploded. *"Did you see these blueprints?"*

She took them, looked at them indifferently. Then she squinted and looked closer. "They don't seem quite right—"

"Right! They're impossible! The pages are all wrong. The notations are all out of sequence, the specifications are turned upside down and crosswise. These blueprints wouldn't build a four-wheeled wagon. They're worthless."

From inside the room Robert's voice came, thin and shaky. "Let him in, Gail. And get Dr. Merry. They've got to work fast."

The boy's face was pale, with blue veins showing on his forehead. McEvoy entered the room, followed closely by Merry. He waved the blueprints at the boy, viciously. "These things," he choked. "They don't make sense—"

"Bother the blueprints," Robert cut in quietly. "They're not important right now. You've got to—"

"Not important! They're vital! They—"

"They're not important!" Robert's voice lashed out in the room, sharp, indignant. "Those blueprints just prove one thing. The transmatter has got to be stopped."

"Never!" It was like a pistol shot in the room. "Until I get those blueprints back—the *right* blueprints—that machine stays on. Your Threshold has them. I'll get them back."

Dr. Bamford's deep voice cut in angrily. "I think it's time we calm down for a moment." He walked into the room, his shoulders stooped. "Sit down, McEvoy. And be quiet for a moment. Merry, how does this transmatter work?"

Alec Merry looked at him gratefully. "Hyper-wavicle dissolution and resolution. Theoretically the transmitter should dissolve any solid object into a distinctive hyper-wavicle pattern, transmit it on a tight beam, and reassemble it in the receiver. But the thing isn't com-

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plete yet. There are a dozen circuits still unwired—"

"But it works anyway!" Robert's voice was sharp. "Doesn't that seem strange?"

Merry scowled. "Of course it does. But it works—"

The boy nodded weakly and sank back on the pillow. "I guess it does. I guess it really works fine. But there isn't any—dissolution and resolution involved. All your machine has done is to set up a force field that twists open another Threshold. A field strong enough to wrench things through a corner of Threshold space, and out again. Nothing more nor less. An artificial force, not even a very great one, from our view, but enough to rip up the very roots of the Threshold universe. Twist it. Distort it." He sat up, his eyes wide and frightened. "No wonder they're afraid! It's tearing their universe to shreds, warping hyperspace through hyperspace, turning the innertube inside out, inverting the circle! Your transmatter is twisting material objects *through places where they simply can't go!*" He jumped out of bed, his thin body trembling. "Can't you see it? All you get is a mild distortion of the objects that get through. But you're wrenching apart their whole universe! Of course they retaliate! What else can they do? They can bring force to bear, too, random distorting force on this side of the Threshold. They've known about the Threshold—I've been crossing through for years. They must have investigated it. And now they're clipping whole chunks of our universe right through into their hyperspace, trying to scare us, warn us off, stop us. They just happened to take San Francisco with them, and Boston was probably just a near miss! And those places are torn out by the roots, twisted up across the Threshold into a wild jungle of distorted geometry and raving lunatics."

The boy's face was white, his voice pleading. "Dr. McEvoy, you've got to turn that thing off. *Before they split the earth in two.*"

Merry turned to McEvoy. "He's right, Mac. We've got to do it."

McEvoy turned on them, his face gray. "This is ridiculous," he grated. "What sort of twisted reasoning has this kid cooked up—why do we have to listen to him? Where does he go when he goes through there? How do we know what he does, or what we can believe?" Venomously he turned on the boy. "Get something straight," he said distinctly. "That spaceship has been the work of three decades. Men have given their lives for it, billions of dollars have been spent, hundreds of years in man-hours have been expended—to get a spaceship built. The transmatter has the specifications that will finish the ship, or keep it on the ground. If this one isn't built, there'll never be another. Why should we throw it away on your word? Why should we believe you, and turn it off? If what you say is true, we'll find a way to fight

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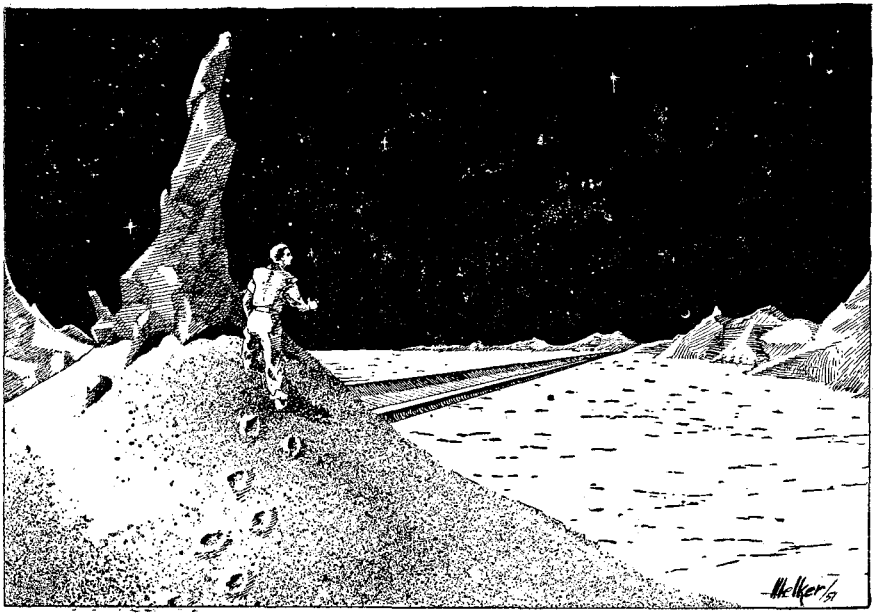

them! Why should we let some wild idea, some crazy universe stand between man and the stars?" He turned to the others, his eyes bright. "Turn it off? Never. Let them roast! Wrench them out of existence. But I'll get those prints, or know the reason why."

The boy stared at him, eyes wide, voice weak and tired. "That's your final word?"

"That," said McEvoy distinctly, "is my final word."

Robert sighed, and drew his bathrobe more closely around his shoulders. Without a word he made a slight turn on his heel. Then, quite suddenly, he vanished.

The place was in turmoil. They were all about him, whirling aberrations in the normal geometric configuration. They took him in tow, fearfully, almost as if they had been waiting for him to cross through, and their thought-force came through to him strongly. They were begging, entreating—

His heart was heavy, his strength nearly gone. He had no stomach for this now, but he had to let them know—somehow—that he had failed. Because man had no concern for their existence, because man was selfish, because man desired more than anything else to reach for the stars.

Their fear struck through him like a physical force. A small bell rang deep in Robert's consciousness.

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What symbol could replace a force? Represent it, yes. Never replace it. A force—*is a force!*

Thought-force! It came from deep in the memory of his own universe, words that Dr. Bamford had used. To describe the consciousness that the Thresholders had demonstrated. Thought-force. If their thought *was* a force, if they *used no symbols,* if their minds were sensitive to thought-force— Sudden excitement ran through him. He had two brains, two memory banks, two analyzers. On this side of the Threshold he had used just one—

But if he could show the Thresholders the contents of the other—!

With racing mind he anchored himself there as solidly as he could. Shut off all perceptics, *withdrew* from his Threshold-mind, settled his Threshold mind on one thing only—*bare survival.* And opened up all the force of his *other* mind! With the last of his nervous strength he twisted the switch, *wrenched it closed,* and cut in full force the circuits of his human mind—

Pain shot through him in intensifying waves. He screamed in agony, holding on to existence with dogged strength, twisting and writhing, choking down his torture. The force heated like a shorted wire, smoked, fused, burnt out—and the pain ended. Abruptly. Only for a short instant had he succeeded, but he *had done it!* And all around him—

Silence. Absolute absence of motion. And then they were there, all about him, plucking at him, twisting him around. There was a subtle alteration from the normal patchwork of whirling motion. Then he was turning, moving. *They were taking him somewhere—*

Back to the cataclysm?

He struggled in sudden weary horror. He had seen that. He had understood it. Why take him back? He fought them, frantically, but they continued moving. On and on. Not far, but through a *different angle* than he had ever moved before. And then, quite suddenly, he was THRUST OUT.

It was nightime. The bright moon shone down on the dark sand. Robert picked himself up from where he had fallen, and a cool breeze brushed his cheek, ruffled his hair. Confused, he shook the sand from his clothing, looking about him.

He was on a sandy hill. Not a tree in sight, not a leaf, not a blade of grass. Behind him he saw the long expanse of desert and dunes, stretching to the horizon, glistening in the silvery moonlight. Ahead of him was a rocky crag, and a smaller hill.

Breathlessly, he struggled up the hill, slipping in the sand, panting in the thin night air. The sand was cool, smooth, unmarked. Where was he? Could they have moved him through the wrong angle in the Threshold? Dropped him in the desert? Surely it *was* desert! But why?

He scrambled up the hill, grasping at a rock at the top, pulling himself up to peek over the top—

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Below him lay a smooth shiny desert, peaceful in the brilliant moonlight. Stretching for endless miles, hillock upon hillock of smooth glistening sand. The rocks on which he lay were red in the moonlight, and looked like blood. Far down in the valley he saw a canyon, long and straight, running across the valley floor to the horizon, and directly beside it, parallel with it, another smaller cleft. Straight and true—

He stood staring down, eyes wide with incredible wonder, drinking in the valley, and the blood-red sand, and the clefts running straight as arrows—

And even as he watched, another moon crept over the horizon—

He walked into the living room, and flung himself down on the floor, exhausted. Gail ran to kneel beside him, sobbing. "Robert! What did you do? Oh, Robert, we thought you had gone for good!"

Merry slipped off his slippers, loosened the bathrobe around him. "Easy, fella," he said softly. "Just rest quietly."

"I told them," Robert muttered weakly. "I told them everything."

Dr. Bamford brought in some hot coffee. "How did you tell them?" His voice was deep and troubled.

"I had to show them everything. My whole mind. Ripped it open for them. They got the pattern, the force of my thoughts. They understood." He choked on the coffee, and took a shaking breath.

Ned McEvoy stooped down to him, eyes bright. "And the blueprints," he said. "Did you get the blueprints?"

Robert's voice was cold. "I did not."

McEvoy looked at him bitterly. "You little brat. You sound as if you don't care."

The boy sat up suddenly, eyes wide, head high in defiance. "No. I don't care at all. The prints don't matter any more. Not one bit. Nor your spaceship, either. I've been on Mars."

McEvoy's jaw dropped for a moment. Then his face flushed red with anger, and he slapped the boy hard in the face with a heavy hand, jerking the small head around. "You've got nerve," he snarled, "coming around with a remark like that. You have to be playful, don't you? Have to play your little games—"

"McEvoy!" The boy's voice cut through like a knife. "I said, *I've been on Mars! Can't you understand what I said?*"

The large man stopped, forehead wrinkled. "I don't get it," he said weakly. "I don't see why you want to joke—"

"I'm not joking, McEvoy. You can turn off the transmatter now, and put an end to the upheaval you're causing across the Threshold. You can forget the blueprints and specifications, McEvoy. YOU DON'T NEED THEM NOW!"

The room was silent. The boy held out his hands, pleading, his eyes

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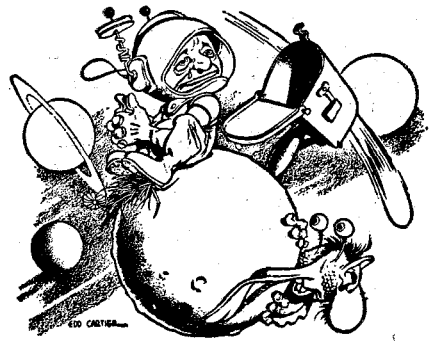
brimmed with tears. "I'm not lying, McEvoy. I *told* them why you wouldn't stop what you're doing. Before, they couldn't understand what was happening, all they could do was strike back. But I made them understand. *And we can throw away the transmatter now, and burn the spaceship.* There's a universe between us, McEvoy, but the creatures of that universe are desperate. They'll be co-operative now, and helpful. *We don't need the spaceship now!"*

McEvoy blinked, fighting to comprehend, to believe. Robert's voice went on, sharp, brittle.

"They have to make us stop, McEvoy. Until they knew, they were helpless to do anything, but now they know. They're bargaining. They're offering us the one thing that man has always wanted. The thing you've spent your life on. *They're offering us free passage through,* McEvoy. Guided passage, that won't harm them. Easy passage." His voice echoed in the damaged room, clear and triumphant. "Can't you see what that means?" he cried. *"THEY'RE OFFERING US THE STARS!"*

McEvoy turned for the telephone, snatching it from its hook, his eyes bright with excitement. Tears streamed down his ruddy face, and his fingers fumbled for the dial. "Operator!" he snapped. "Get me long distance. I want to call New York!"

THE END



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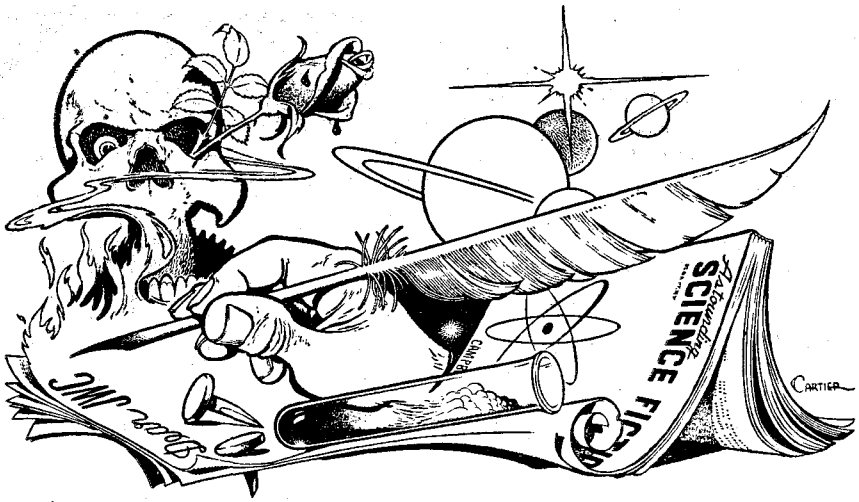

BRASS TACKS

Dear Mr. Campbell:

I was more intrigued by the article "Clipper Ships of Space" than by anything that has appeared in ASF for a long time. Here is a genuine original contribution to mankind's thinking and — possibly — well-being that would never have been thought of in this century except for the existence of science fiction as an organized activity.

I have read with interest Willy Ley's comments on the practical value of this idea. However, it seems to me that the very fact he stresses, viz. the expense of crews, is what makes the project most valuable. For I believe that this kind of ship could operate *without any crew at all.*

A sailing ship on Earth's oceans needs a crew because, the science of meteorology being what it is, we cannot predict in advance what winds will blow. But the factors governing the motion of a "space clipper" are all predictable: radiation intensity, gravitational fields, periods of rotation, et cetera. Therefore it should be possible to calculate in advance the actions necessary for the ship to follow any particular course, such as rotation of the sail, lengthening or shortening rig-lines at a given rate, et cetera. A not too complicated governor could then take the place of the crew at all times except emergencies. If the ship gets hit by a meteor or some other unforeseen event occurs, it could summon help by means of a continuously

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broadcasting reporting device, as in a radiosonde. As Mr. Ley states, it is not really very hard to get anywhere in the system once you are out of the immediate field of the planets. But it does take time, and for routine operations such as freight transfer it would probably pay to have crewless sailing ships.

Two complications occur to me in the operation of these boats. First there is the question of evaporation of the sail, which would be a major problem in space. Possibly this can be overcome by using a material of very low vapor pressure such as tungsten, but this involves new structural problems — metals like tungsten or tantalum crystallize easily and their tensile strength is not too good.

Then there is the question of getting closer to the sun. This is solved by Mr. Saunders by mentioning tacking. I have not yet done any calculations on this but it seems to me that even when you reduce the angular momentum of the ship so as to throw it into an ellipse with smaller perihelion, there will always be an outward component to the force, so that the ship will be on the outward portion of the orbit. The closer you want to get to the sun, the more "cometlike" such an orbit would be. Now comets have extremely long periods. Halley's comet does not go out as far as Neptune, but its period is over seventy-five years, and what is worse, we cannot exactly predict—because of perturbations by asteroids on its way out, et cetera—just where

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it will be when it returns. Such an orbit would be most undesirable in a ship.

I would very much like to hear comments on these points. I am sure that the theory of these ships will be extensively gone into, and I should like to be in on it. So if you refer this to Mr. Saunders and/or Mr. Ley, please mention that I would appreciate their comments.—A. H. Samuel, 520 E. Washington, South Bend, Indiana.

It does seem reasonable that they could operate without crews!

———

Dear Mr. Campbell:

In slightly belated reference to A. J. Cox's article on linguistics published six months ago, I would like to give a bit of comment.

At Page 130 of the August issue, Cox says: "Indo-European languages are basically three-valued; they have a past, present and future"—in contrast to the Hopi language, where time is relative to the speaker.

Now here is a quotation from a philologist analyzing the evolution of the verb system of the Indo-European languages: "As regards the tenses, at least, it has been shown that . . . there is no difference in formation between present, future and aorist stems, while the earliest meaning of the perfect was that of a special kind of present expressing either repeated or intensive action or state. . . . The tenses in fact did not originally express the times when the action took place, but the type of action which took place. Thus the present system in the main expressed continued or durative action, the aorist only the fact that the action had taken place." The Hyksos invaders of Egypt of the Eighteenth century B.C., or other contemporary "Aryans," probably would have a lot more in common linguistically with the Hopi Indians than with us, their linguistic descendants. It would be interesting to have a time-travel story in which the different structure of the language at different periods of time makes an earlier race better able than a later one to develop some complex science or symbology, as for example relativity. It might well be that some of our Neolithic ancestors would understand Einstein much more easily than we.

I think the *time* element should be stressed as much as the geographic. Languages change almost like lightning. We are less able to understand the English of 950 A.D. than we are the French of 1950. And when it comes to stretches of several thousand years—well, Indian languages like the Hopi aren't so queer after all!

This answers Poul Anderson's query on pp. 160-161 of the February issue. You're darn tooting the Neolithics spoke an inflected language! They spoke tongues far more highly inflected and complicated than most of those spoken today. For instance, the Indo-European

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language nouns originally had *eight* cases. Now, the most complicated language almost anyone reading this will have learned—so far as inflections go—is Latin. And Latin retains only five cases, with traces of a sixth, of the original eight. Tenth-Century Anglo-Saxon used four. Today, we're down to one. As a matter of fact, it is the most primitive language which has the most complicated grammar. As soon as people establish an agricultural civilization, they start to prune the grammar down. (This process is referred to by philologists as "linguistic decay.")

Of course, when we say "inflected," we must use it in the broad sense. There is a technical linguistic sense in which certain languages—the Indo-European family; the Semitic—are classified as "inflective," in contrast to other groups which are "agglutinative"—e.g., Turkish—"monosyllabic – e.g., Chinese – or "polysynthetic"—e.g., Delaware Indian. The most important of the "non-inflective" languages is the "agglutinative" group. In the history of Europe and Asia, peoples which spoke agglutinative languages, such as the Iberian peoples of Western Europe—who were overrun in the second millennium B.C. by the Italo-Kelts—and the Sumerians of Mesopotamia, seemed as well able to develop civilization as were those who spoke "inflected" languages. The reason is simple: an agglutinative lan-

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guage seems as good a vehicle for logical communication and thought as an inflected one. For practical purposes, it doesn't make much difference either way. As a matter of fact, some of the decayed "inflective" languages, such as English, have independently adopted some of the devices of the agglutinative group.

Incidentally, that quotation I gave on the verb system of the Indo-European languages isn't based on new work. I took it from the 1911 edition of the Encyclopedia Britannica—vol. 21, p. 435. Which only goes to show that a new and interesting idea if interesting may not be new.

Finally, just a brief supplement to a statement by one L. Sprague de Camp. De Camp says in his letter in this February issue: "No kings in their pyramids have been found in modern times because . . . (grave robbers) . . . got to them first." This is true of the pyramid Pharaohs, and even of most of those Pharaohs who contented themselves with more modest mausoleums. But archeologists have had a little more luck in the last generation. The biggest stroke was when Carnarvon and Carter discovered the tomb of Tutankhamen. They discovered it intact because rockfalls had hidden the grave from the assiduous grave robbers of thirty-five hundred years. And they got an indication of how much riches were usually deposited in royal tombs by what they found there. Although King Tut was one of the minor pharaohs, the wealth in that tomb was worth millions. Tut's was the only tomb in the entire Valley of the Kings at Thebes which had escaped the larcenous attentions of "acquisitive lads like Abdallah." — Samuel Trenchard, 4814 Wilson Avenue, Montreal 29, Canada.

As I recall it though, King Tut wisely refrained from joining the Pyramid Club — and so slept soundly.

———

Dear John:

What with working on an archeological report, running six school broadcasts a week, and trying to get my hand back at science fiction writing, I have been neglecting my balloting of late. Herewith the March tally:

(1) "Protected Species"
(2) "Space Fear"—love that Lannai!
(3) "Experimentum Crucis"
(4) "Philosophical Corps"
(5) "Casting Office" — should probably be higher.
(6) ". . . Of the People"
(7) "The Man from Outside"
(8) "High Threshold"

One main criticism of this issue: ". . . Of the People," "Man from Outside," and "Philosophical Corps" are too close together in theme to be in the same issue. And "Space Fear" is really almost the same thing.

Let us now be erudite: it seems

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to me Vogt, Osborn, Vincent and de Camp are all circling like mad around the basic fly in the conservation ointment — the fact that Man is an animal with a society, in just about the same sense that a cow is an animal with horns and a moose an animal with antlers.

So it should be plain to any kid in the fifth grade—is plain to any kid in the fifth grade, I may say—that the way to stop overgrazing is to quit overgrazing—that the way out of our policy of cutting trees faster than they grow is to put the forests on a self-sustaining harvest basis—that one of the things to do when it appears that we're using up our iron ore is to stop burying scrap in the city dump. But, as Man-with-a-society, can we *afford* to do what is smart, sensible, and necessary? Perhaps not without making some basic changes in our society.

Take trees, of which I have some first-hand knowledge due to conservation work here in New York State. We say that the smart, up-to-date farmer will put his farm woodlot on a perpetual yield basis—harvest the mature trees at the advice of a forester, replant the varieties which will grow best and have the greatest future market value, and weed out the "weed" trees, the misshapen and diseased which compete for soil, water, and sunlight. Maybe he can't *afford* to weed that woodlot, to improve his stock. He has no use for the trees he culls out. He no longer uses wood for fuel—oil or bottled gas are cheaper nowadays,

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and far more convenient. Any time and money he and his hired men put in on the woodlot, doing anything but cut for the saw mill or the pulp mill, is money down the drain.

How about the big lumber company, with thousands of acres of forest. If it cuts selectivity, if it reforests, if it weeds, maybe it can keep those forests producing for an indefinite length of time, gradually improving in quality and value. But right now lumber is scarce—it's a seller's market; name your own price and if you don't someone else will. Does the company cut it clear, while the price is tops, or hold on, taking a fraction of the profit, with the likelihood that the market will collapse? A quick smash now, then retire—or a dribble, up and down for years? Can the lumber company *afford* to think of the future?

Sure we can pile fertilizer on the land to replace almost any kind of foolishness—read Heinlein's "Farmer in the Sky" for the ultimate in *that* line. We can retire the fields and grow all our food in bathtubs, with water and chemicals—read your own "Moon Is Hell." But who could *afford* to buy the food grown in this way?

Will the Chinese or the Indians adopt wholesale birth control? Will we? Whether or not our urge to perpetuate the race is basic or not, our respective societies certainly have no place for such shenanigans. No—we are all men-with-cultures, men-with-societies, *not* men-in-a-vacuum. Our culture, our society is compounded of our past, of our present relationships among ourselves and with our neighbors, and of our hopes for the future. Changes in attitude must creep in before, as a people, any of us can take the long view in which the future outweighs the habits of the past and the conveniences of the present. We must literally live in the future, and what kind of society that attitude will breed is a pretty problem for Messrs. Heinlein, Asimov, and any other takers.

Meanwhile? Well, if we keep on as we are there probably won't be anything left to live for in that future, so something has to be done—something drastic. Control of cutting practices—so that the lumberman can't cut-out-and-get-out or grab the public parks, even though the small farmer may still not be able to afford to weed his woodlot. Control of grazing—of farming practices—of mining—of salvage—of the fishing industry. Control! We don't like it. Our particular society is conditioned against it. But it can be controlled by local and regional boards which administer what the scientists say must be done, rather than an edict from Washington. Ecologists are the boys to draft the policies—not agronomists, who are concerned only with food crops; not foresters, concerned only with cutting trees; not flood-control engineers, trained only to build ten dams where one now flourishes. Mankind-as-a-whole, complete with society or

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societies, in the world-as-a-whole is the picture which must be studied—see the last episode in Asimov's "I, Robot."

Conservationists are accustomed to being labeled Communists or Fascists, as the wind blows. Under the new association rules we can hardly avoid being convicted of it: is your office in the same building or the same block or the same town with that of an organization convicted or even accused of being a Red front? But the Germans, who took and take great pride in being the fathers of scientific forestry, hacked the equally well managed forests of Norway—which was supposed to be a segment of the thousand-year-reich. As they saw it, they couldn't afford to practice what they had been preaching for the last few centuries. I don't know, and I don't know who does, but I will lay odds that the Russians, who more or less invented soil science, will ruthlessly exploit and expend their soil, their forests, their mines, and their people to gain the end of world domination which seems to be a feature of their current society. (I can't, for the life of me, find anything wrong with the Swiss, who seem to have balanced what they need very nicely against what they have over a period of generations—but maybe I don't know enough about the Swiss.)

We, as individuals, as nations, as federations of nations, as a world will take such care for the future as we can afford to take. But "afford" is a word which takes its meaning from our several societies. I wonder what population the world can afford?—P. Schuyler Miller.

In other words, "I don't do what I know is right because We don't let Us!"

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and I suspect it has.

Ecology is the study of the economy of living things; the interrelationships and interdependencies of life forms. All living things constitute a planetary organism, in a sense. Man sprang from the living forms of Earth; he is still a part of the system. In the development of organisms, living cells learned to specialize, to take on special functions, producing substances not intended for their own use, but for the use of the rest of the organism—the adrenal gland, the Islets of Langerhans, the bone marrow that produces cells that live only to produce needed corpses, the red blood cells.

Penicillin is produced by a certain type of mold—but penicillin today is produced by a specially mutated strain that is being fitted into the ecology of Man; the mold is a successful mutation because, in the presence of Man's industry, that is a survival characteristic. The modern cow is a similar evolutionary freak; the dairy cow's characteristics are survival characteristics only in the presence of Man. The modern strains of beef cattle, like red blood cells, live only to produce useful corpses. The modern strains of apple trees are similar examples; their gigantic seed pods produce seeds that are never planted, and never grow; the type is propagated by grafting.

The overall evolutionary mechanism is that *Man is creating a planetary organism in which animal forms and plant forms co-operate in mutual survival, instead of individual survival.* The liver cells of an animal are incapable of surviving alone, as their remote, ancestral forms did. Man is in process of creating a world-organism of life forms that are similarly incapable of independent survival.

And the chemist is playing a major role in that slow organization; DDT, 2-4-D, many of the sprays and medications that have been synthesized and extracted are playing a role in building that interdependency.

The next step, however, is for the chemist, in his role of biochemist, to start consciously evolving strains of living things to produce the complex compounds he wants. It is easier to produce complex organic molecules that are not simple repetitive patterns, like the synthetic polymers, by biological processes. It is also a fairly simple problem—in its basic theory—to develop, by forced evolution, a biological mechanism that produces the desired substance.

In the past seventy-five years, we have learned techniques for producing what we want synthetically; it seems to me that the next step is to produce the living organism that produces what we want.

That's a legitimate activity for a life form, too!

THE EDITOR.

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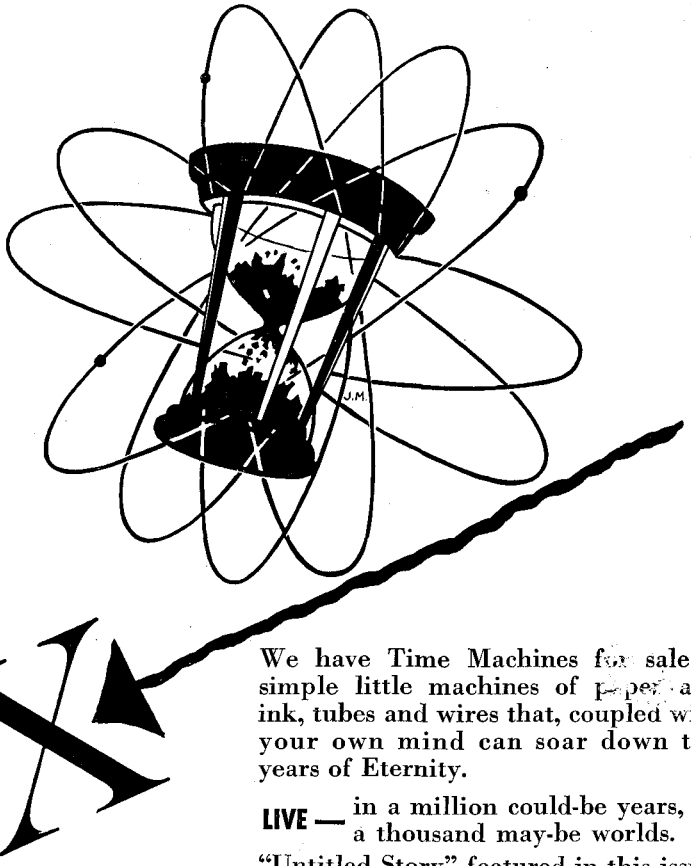

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